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COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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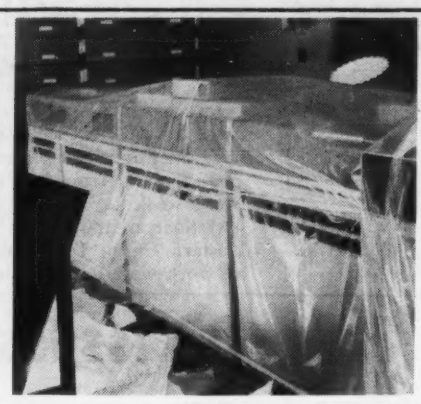

(CW Photos by T. Wiseman)

NCR field engineers covered Central State University's Century 100 with plastic sheets after the twister removed the windows, roof and part of the wall which had originally protected it in Bundy Hall (left).

In the Tornado's Wake

Center Left Standing...Barely

Computer centers were remarkably spared when tornadoes ripped through 10 states and southern Ontario, Canada, recently leaving 338 persons dead and damage in the hundreds of millions of dollars.

The most traumatic effect on most computer centers in the area was the widespread power outages following the most intense tornado activity in almost 50 years – and in some cases a complete loss of communications facilities.

Local observers reported that computer centers seemed to escape widespread damage because the twisters generally did not hit downtown business areas, which would have more computer equipment than the suburban housing areas that received the full onslaught of the storms.

From Xenia, Ohio, a town that was 80% destroyed by the twisters, staff writer Toni Wiseman filed the following report describing one particularly hard-hit center and the general destruction in the wake of the storms.

The Xenia area was one of the hardest hit by the recent tornadoes with more than 30 persons killed, hundreds injured and damages estimated at some $75 million.

In nearby Wilberforce, the tornado cut a path through the middle of Central State University (CSU) destroying 80% of the campus. Among the buildings left standing, but severely damaged, was Bundy Hall, the administration building housing the university's computer.

Cheryl Sullivan, assistant director of data processing, was working on a file of new charts of accounts with two other members of the staff when an electrical storm was spawned. After a momentary loss of power, Sullivan ordered power to the NCR Century 100 cut off until the storm passed.

According to her account, she and her staff were waiting for the weather to clear, when someone spotted a big, black cloud in the distance. Sullivan told everyone to go to the basement two or three minutes before the tornado hit the campus.

"We weren't down there very long," Sullivan said. "It seemed like only a minute or so that the wind howled so badly that we sensed the building almost shaking.

Different Scene

"Suddenly it was calm and we realized it was time to go back upstairs. It looked nothing like what we had left," she said. "All the windows in the computer room were broken out, part of the wall had gone and it was just a mess.

"There was dust over everything. We didn't stay long," she confided, saying that they only took time to replace the disk packs in a cabinet before "getting out in a hurry."

The next morning, Al Kern, NCR district field engineering manager, went out to CSU to

(Continued on Page 2)

And First Front-End

Communication Nets Key Cyber 170 Usage

By Vic Farmer
Of the CW Staff

MISSISSAUGA, Ont. – Communication networks – that's the theme that permeated Control Data Corp.'s announcement of four new large computer systems, a Network Operating System (NOS) and a communications front-end processor here last week.

The four CPUs in the Cyber 170 Series – the 172, 173, 174 and 175 – use the same architecture and same 60-bit word structure as its previous CDC 6000 and Cyber 70 Series computers, but they incorporate integrated circuit (IC) logic and metal oxide semiconductor (MOS) memory similar to IBM's later entries into the 370 line.

CDC, heretofore, had used discrete components and core memory, but with the change to up-to-date components has managed to cut the physical size of these systems in half.

The systems are upward-compatible from the previous CDC 6000 and Cyber 70 systems but sacrifice some downward compatibility because the Cyber 170s now incorporate hardwired parity correction in both main memory and in the peripheral processors.

Single-bit error correction and double-bit error detection are also new, as well as a feature that allows central memory degradation which locks out inoperative memory but maintains system operation with reduced memory.

CDC roughly compares its four models of the Cyber 170 Series to IBM 370 mainframes for users with a 60% scientific load and a 40% commercial load as: the Cyber 172 equal to a 370/145-155; 173 equal to a 370/155-158; 174 equal to a small 165; and the 175 to a 168 or large 165 in processing power.

The maximum central memory sizes are 131K words on a 172, with 262K words on the rest, but optional core memory is also available in 125K to 2M 60-bit word chunks. The 170s can be expanded by the addition of 10, 14, 17 or 20 peripheral processors and from 12 to 24 channels. While central memory has 400-nsec access and cycle times, the peripheral processors operate at 500-nsec cycle times.

The Network Operating System (NOS) is said to be a merger of both the Scope and Kronos operating systems used in previous systems. NOS is, however, oriented toward the support of large numbers of remote terminals – up to 512 – and can process local batch, re-

(Continued on Page 5)

Probe Spotlights DP School Inadequacy

By Patrick Ward
Of the CW Staff

BOSTON – "I'm sure you can do the work here," salesman John Everson told a potential student who had just scored 54% on the qualification test given by Electronic Computer Programming Institute (ECPI).

The "potential student" had deliberately chosen wrong answers. Actually, he was a reporter for the *Boston Globe*'s "Spotlight team," which has just completed a four-month investigation of for-profit vocational schools.

The *Globe* hired an experienced DP consultant to examine ECPI, who found serious deficiencies in the school, including its use of the qualification test as "a selling tool" to enroll, rather than weed out unqualified applicants.

The Boston branch of the nationwide ECPI chain offers a four-and-a-half-month course in computer programming for $1,850.

But the consultant found the school appeared to be providing a course substantially different in content from the one it advertised, and found ECPI to be distorting the announced purpose of its course.

"They gave the impression that the school had a solid, successful record in training people to be programmers," the consultant charged.

"They claimed high placement," he continued, "but the school actually regards placing graduates in computer operator jobs as "high placement."

And training was lacking even for operational work, the consultant added.

In touring the school's computer room, he found "no decent logbook, no discipline in the computer room, no training as to how to run a computer room or operation."

ECPI had only a small Univac CPU with "extremely limited" capability for teaching students the fundamentals of computer programming, the consultant observed.

Salesman Everson told the *Globe* the school had placed 80% to 90% of its graduates in programming jobs, a claim that a knowledgeable former employee said was preposterous, the *Globe* story stated.

The former employee estimated that no more than 10% of the school's graduates get "decent jobs" in the DP field. At least 50% of the students leave the school before graduation, he added.

High school dropouts and underprivileged youths made up the school's primary "market" and TV advertising was found to be the "perfect way of getting leads," one former salesman told the paper.

The question of ethics and professionalism in the DP training field "is a major problem for our profession and it is degrading to us," said Homer Cates, president of the Boston chapter of the Society of Certified Data Processors.

The for-profit DP schools that purport to provide people with the background to enter the DP field

(Continued on Page 2)

UPI Strike Ends, but DP Issue Stays

By E. Drake Lundell Jr.
Of the CW Staff

NEW YORK – Writers and editors for United Press International "reluctantly" went back to work last week after a 23-day strike even though the issue of "computers in the newsroom" was not fully resolved.

The use of computers and their associated display terminals by staff members had been considered "a very important" issue by the negotiators for the Wire Service Guild here at the beginning of negotiations.

The increasing computerization of the wire services had also played a role two years ago in negotiations with the teletypewriter operators at the wire services, who are now being phased out by automation.

Previously, the staff typed copy or wrote it in longhand. It was then given to a teletypewriter operator who punched a paper tape for transmission over the wire to newspapers and broadcast operations.

Now, however, the writer types

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On the Inside

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Tornado Barely Leaves DP Center Standing

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assess the damage and determined the first priority was to protect the equipment.

Field engineers got the equipment under plastic before the rain and snow hit the area, but, Kern said, the dust and debris may have damaged the equipment. No physical damage was obvious, however.

No Testing

The computer is still in Bundy Hall and at press time no testing had been possible since power to the building was still cut off.

The system's disk packs, however, according to an NCR spokesman, were picked up by the field engineers and taken to the Dayton Regional Systems Center, where CSU personnel will be able to run their programs on backup equipment.

Another computer, an IBM 360/25, was reported located in a Super Valu store just outside downtown Xenia. Details were not available as the heavily damaged building was cordoned off by National Guardsmen, who were bulldozing debris from the area.

In Brandenburg, Ky., a keypunch center run by the local electric cooperative was destroyed along with a large portion of the town.

An IBM systems engineer who inspected the damaged center said: "We couldn't even find any of the equipment. It must be spread all over Kentucky by now. The whole center is gone completely."

In other areas, location of the computer center in a building saved it from destruction, as was the case of J.W. Harris Co. in Cincinnati.

While offices were destroyed around it, the firm's computer system – a Honeywell 2020 – was spared since it was in the southwest corner of the building, the safest place during a tornado.

"Fortunately," a center staff member said, "we were only running test programs" on the system when the storm hit at 6 p.m., so no data was lost because of the power outage following the tornado.

The firm reported it was up and running its system again the next morning when power was restored, having lost only two boxes of unpunched cards stored outside the computer room.

On the communications side, many local telephone companies were knocked out of action, prohibiting data communications on the part of companies whose centers had been physically spared from damage, causing lost time, but little lasting problems.

Once again, as in the case of the electrical outages, the communications links were out for varying times in the 10-state area, ranging from less than an hour to over a week.

At Sharon, Ind., three antennas in the Western Union Telegraph Co. microwave network were damaged by the tornadoes.

CW Photo by T. Wiseman

CSU's DP equipment remains in the computer room, amid dust and rubble, awaiting the rigger which will remove it some time next week.

The damage to the dipoles and parabolas was repaired in two hours and 15 minutes, a spokesman said. The microwave station has a capacity of 600 channels but it is not known how many of these were in service when the antennas were hit by the winds.

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UPI Strike Ends; DP Issues Not Fully Resolved

(Continued from Page 1)

his story directly on a CRT – called a Video Display Terminal – at the same time entering it into the main computer system which sends it out to the wire subscribers.

Members of the Wire Service Guild have generally reacted "favorably" to the new system, a guild spokesman said, but added that there were "fears" over its possible future consequences.

In the original contract talks with UPI management, the guild outlined four demands concerning the VDT system:

- The VDT must be used only as a substitute for typewriters and other manual methods of preparing copy.
- Employees must be given an option between the use of the VDT and typewriters.
- No standards on speed or accuracy of operation of the VDTs must be imposed.
- Writers must not be made to recopy the text of long speeches or the work of fellow staffers on the VDT system.

Compromise Move

The management rejected all of the demands, but as a compromise move wrote a letter as part of the contract settlement that indicated management would not impose accuracy or speed standards, and saying that employees would not be expected to do any more recopying than in the past.

The other two demands were not dealt with at all.

Guild negotiators said last week the new contract obviously leaves many areas regarding computerization "unresolved," and said they felt the new contract was "the best we can get" at this time.

Negotiators indicated they were worried that UPI management might abuse the VDTs by requiring writers to essentially act as typists recopying speeches or the copy of colleagues less talented in using the VDT.

"We don't want a situation to develop where rewards and punishments are granted on the basis of a newsperson's mechanical ability on the VDT rather than on his or her ability as a reporter," one union source said.

Another guild spokesperson indicated the present situation was a compromise that was not as strong as the guild would like to have seen, but claimed that because the issue of the use of VDTs in the newsroom was acknowledged as a problem in the contract, this was a step in the right direction.

Seattle Sewers Speed Runoff

Special to Computerworld

SEATTLE – You may have heard about Seattle's rainfall. It doesn't come down heavily, but it does come down steadily.

Enough so that a real-time computer system is used by the Metro sewer system to speed runoff water on its way to a treatment plant.

Computer Augmented Treatment and Disposal (Catad) is the name of the over $3 million system. Catad dynamically opens and shuts interceptor gates in the sewerage system trunk lines to match area rainfall patterns. Thirty-five "electric eyes" measure the rainfall in various parts of the city, to anticipate runoff channels where the need is highest.

If the rainfall is high in the Mt. Baker district, trunk lines are opened to facilitate flow from that area. Other trunk lines, where rainfall is lighter, may be closed and the trunk actually may serve temporarily as a water storage area.

The computer digests rainfall quantity, runoff speed, drainage area and the type of surface before making its flow determination predictions and decisions.

Metro officials feel that Catad reduces overflow situations by 80%, and is $70 million cheaper than more traditional methods of storm water control.

File Backup Procedure Prevents Lost Data

A simple way to determine the security of your computer system is to check it against these security "musts" concerning file backup procedures:

- Establish a daily backup system which includes copying disk files onto tape or copying disk records before and after transactions are processed.
- Copy the complete program library onto tape monthly.
- At periodic points of time, for example monthly or quarterly, copy all current programs and files onto a backup medium.

This checklist was compiled by DCF Systems Ltd., 74 Victoria St., Toronto, Ont. M5C 2A5.

Class Cutters Won't Escape

WAUKESHA, Wis. – Because it takes local high school offices here two weeks to compile truancy lists, the town school board is seeking computer help to hasten the process.

Using a DEC PDP-11/20, from the Cooperative Educational Service in Waukesha, the local high school administrators will feed daily attendance lists into the school's terminal starting next fall.

Besides providing by the next day a list of those students who cut classes, the computer will print letters to parents for administrators to send out.

All Users Welcome To CPEUG Meeting

ATLANTA – "Anyone (in or out of government) who has anything to say or learn" about computer performance evaluation (CPE) will be welcome at the spring meeting of CPEUG, the CPE user group, to be held at the Sheraton Biltmore here, May 21-23. Registration fee for the two-and-a-half-day session is $10, according to CPEUG chairman William Letendre of the Air Force.

Ideas for presentations are invited, but abstracts of presentations should be sent to Fedsim/CA, Attn: Philip J. Kiviat, Washington, D.C., 20330, prior to May 1.

DP School Inadequacy Spotlighted

(Continued from Page 1)

at five-figure salaries are misrepresenting their courses and misleading students, Cates added.

What these schools can do is help students learn to be RPG-type programmers or operators in System/3 or other small computer centers, Cates said. These schools ought to be frank about what sort of jobs and salary level their training can lead to, he stressed.

Two ECPI officials refused to talk to the *Globe* about their school.

William Kalaboke, vice-president of the company that owns the school, requested that questions be submitted in writing and then did not answer them, the *Globe* stated.

Sidney Neeley, director of the Boston school, refused to state his own professional qualifications, the *Globe* said.

A little doubt was cast on those qualifications by a photo the *Globe* ran with its story. It showed Neeley sitting at a booth at a training fair for veterans. Behind him is a sign with the letters 'ECPI,' and beneath that, the word "computors."

"Psst, Bub – How About Signing Up for a Sure Thing – You Can't Lose . . ."

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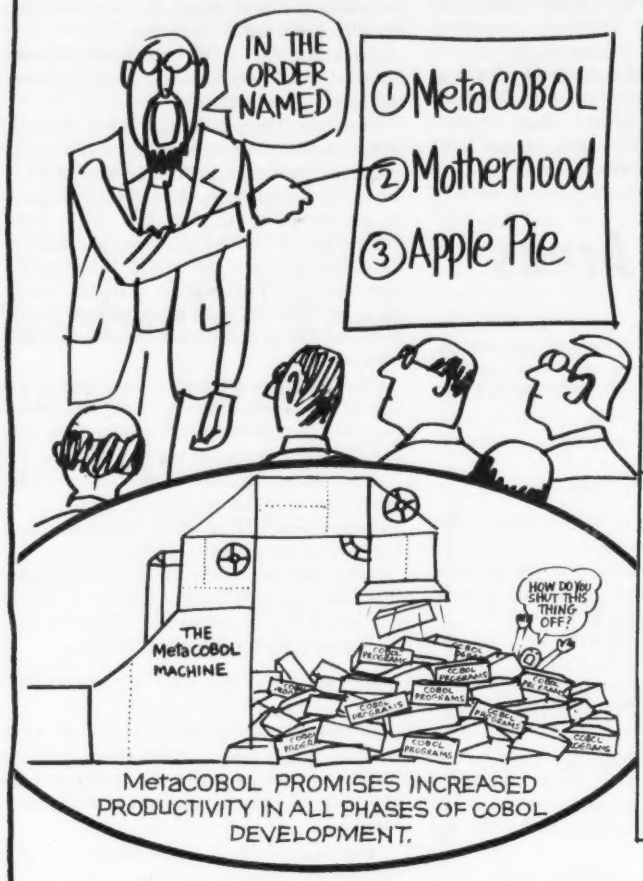
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Breakthrough In COBOL Productivity Claimed

PRINCETON, N.J.—According to an ADR spokesman, MetaCOBOL is proving to be a breakthrough in computer programming. Not only does MetaCOBOL improve the productivity of a COBOL programming shop by over 50%, but if used properly, the reliability of the programs themselves increase significantly. According to ADR, however, installations must be ready to devote manpower to supervise the use of MetaCOBOL. Making the commitment today will bring significant and immediate savings—but most importantly will prove to bring even greater savings during the life cycle of the applications involved.

ADR states that MetaCOBOL's macro facility, besides being able to generate COBOL statements, can be used to analyze programs as well. Thus, ADR has developed macros which check for standards conformance, evaluate COBOL source code for efficiency, and audit source code for illegal statements. These macros, which are supplied in source form, can be user-customized to fulfill the requirements of a particular installation. The macro facility, plus the test data generator, debugging, and measurement options make MetaCOBOL a unique system for significantly improving COBOL productivity and reliability.

New Brochure Presents "The Age of MetaCOBOL"

PRINCETON, N.J.— The auspicious sun signs in the lives of data processing people under the ascendant influence of MetaCOBOL are depicted in a colorful new brochure available from Applied Data Research, Princeton, N.J. Its title is "The Age of MetaCOBOL."

Using capsulized zodiacal concepts as metaphors for the metapowers of MetaCOBOL, the new brochure is an unusual piece of literature on an unusual software product.

Complimentary copies are available on request to data processing professionals, just by filling out the coupon on this page and mailing it to ADR.

Immediate Economic Benefits Available to COBOL Installations With MetaCOBOL Libraries

PRINCETON, N.J.—Libraries of specialized functions, distributed to all MetaCOBOL users, are bringing immediate benefits to COBOL installations. These libraries (seven in all), which can be customized by the users themselves, are divided into two groups—The Program Development Library and The COBOL Utility Library. The Program Development Library contains abbreviations and extensions of the COBOL language to reduce program development cost and effort, while significantly raising the level of program clarity and maintainability. The COBOL Utility Library contains functions which are applied to existing COBOL programs for analysis, modification, and standardization of the source code.

The COBOL Utility Library consists of:

Standards Auditing, which diagnoses common programming standards violations in COBOL source and produces standards summary reports. This function is a necessity for internal standards enforcement and a valuable technique for reducing maintenance costs.

Source Program Optimization, which highlights inefficient statements and data usage in COBOL source code and summarizes results. This procedure is valuable not only for COBOL optimization, but for COBOL programmer training as well.

COBOL-to-COBOL Conversion, which translates IBM Levels D, E, and F, RCA Spectra and Honeywell H-200 to IBM DOS or OS American National Standard COBOL. MetaCOBOL allows for new features of compilers and operating systems so that your conversion will result in the efficiency you're seeking.

Special Utilities, which perform automatic level and paragraph numbering, mapping of record descriptions, and many other functions. These utility functions relieve the programmer of concern for many required standards and documents during program development, and can be reapplied following program maintenance.

The Program Development Library consists of:

Short Forms, which can replace the full COBOL text they represent to reduce coding labor by 30-60%. ADR- and user-supplied short forms can be used for required COBOL words and phrases, for frequently-written Data- and Procedure-names, for name prefix expansion, and for redundant logical statements.

New Verbs, which can be written in place of redundant and often complex COBOL functions. Like standard COBOL verbs, MetaCOBOL verbs can accept any number of variables and can therefore generate optimum, data-dependent COBOL statements, work areas, and subroutines.

Major Logic Generators, which use interrelated sets of verbs to define major logical elements of a COBOL program such as report writing, file match/merge, input validation, and, most important for today's technology, data-base interfaces.

MetaCOBOL is available under monthly or permanent license. For additional information on the MetaCOBOL Libraries, contact Applied Data Research.

DPers at United Fall Into 'Forced Ranking' System

By Patrick Ward
Of the CW Staff

CHICAGO – Like the apprentices, journeymen and master craftsmen of medieval days, DP staffers at United Airlines fall into one of three levels based on their achievement, Alan E. Peters, United's director of computer services, computer and communications services division, told a Computer Caravan panel session on personnel last week.

The DP division's staffers go through a ranking procedure once a year as part of a group of about 50 to 100 people, Peters said.

'Forced Ranking'

Under this "forced ranking" system, staffers within each salary range of given job classifications are categorized depending on how their performance compares with what the company thinks it can expect from an experienced person in that job category.

The department receives a certain amount of funds for pay increases, but

Caravan/74

under the plan, those staffers who have performed especially well can get a big raise as they move to the higher ranking, and those who have performed poorly can face a pay cut. Seniority does not affect the system, Peters emphasized.

The DP division has not found a strictly objective approach to evaluate a person's performance, Peters noted. Each manager ranks his own people and talks to his own manager, who looks at the proposed rankings. One problem is that strong managers will do more for their people than other managers will, Peters allowed, but even so, he said, "we're pretty much sold that this is a highly acceptable way of rating performance."

The four panelists had conflicting views on hiring practices.

Kay Clatterbuck, personnel adviser of the Information Management Services Division of the First National Bank of Chicago, said her group likes to hire people with bachelor's and master's degrees in computer science.

But Neal Thomsen of CNA Insurance Co. said his firm didn't experience the same good results with computer science graduates.

"Some of these people have illusions of grandeur," he charged, adding that he has fared better with more experienced people.

And Ronald Stewart, systems development director for the hospital division of the University of Chicago, remarked that an undergraduate major in computer science "is not a valid discipline."

Education for a DP career should emphasize "problem definition and problem solution," Stewart said.

When the First National Bank recruits non-computer science majors for programmer trainee jobs, Clatterbuck said it looks for people who have college degrees in quantitative subjects and with some knowledge of what a programmer does in his working day. She said interviewers also ask the prospective trainees where their interest in programming developed and what they had done to follow up that interest.

This helps separate those really interested in programming from those simply looking around for a well-paying job, she said.

The panelists split on the value of employment agencies in finding talent.

Clatterbuck said the First National Bank uses about six agencies extensively.

Peters said his group does not use agencies, but Stewart used them to a degree and cited the importance of rapport with an individual recruiter in an agency.

How do you find and sign up the best talent?

"You must have a specific idea about a specific job in your corporation," Clatterbuck stressed, or else you won't get the top people who are eager for involvement.

"Our best source of professional and technical people is our own employees," she added, and praised the bank's $100 "bounty" program for finding new employees.

Good, Bad in Multivendor Sites in Same Areas

By Toni Wiseman
Of the CW Staff

Jack Kennedy

ST. LOUIS – A multivendor installation offers the user both advantages and disadvantages, often in the same areas, according to Jack Kennedy, director of commercial data processing for TWA.

Kennedy listed cost as one of the advantages of going to a non-mainframe manufacturer, adding that length of the lease, number of pieces and other such factors would influence the savings.

Reliability Factor

"Most gear that you would look at from a non-mainframe manufacturer is going to give you better operating performance than you would get from a mainframer," he said, "but that does not necessarily apply to reliability of the hardware."

Kennedy told a recent Computer Caravan workshop here that in some cases, however, independent equipment is just as reliable, if not more so.

Kennedy noted that a user could expect such benefits as better access time and better cost performance from non-mainframe manufacturers because they tend to specialize in their product line and put in some enhancements that a mainframe manufacturer would not.

Deliveries is an area of both advantage and disadvantage, he said. Equipment selection may be better with Ampex or Itel than with IBM, he said, because their lead time may be less.

On the other hand, he stated, delivery is a function of having the parts available. He recommended scouting out the situation before agreeing. Areas to consider include how many spare parts are kept in the city, how many the vendor is willing to keep on site for the user, where the backup supply is and the transportation available between that site and the user installation.

As an illustration, Kennedy stated TWA has an agreement with IBM that if a part is needed, two will be ordered and flown in from separate locations.

Maintenance Problems

Non-mainframe manufacturers' maintenance can be a real plus, he said. "Many times with another vendor you can get an on-site CE, dedicated to one particular type of equipment, Kennedy said, whereas the mainframe manufacturer's man may be spread across many types of equipment in an installation, and "if two pieces are down, you'll have to decide which gets repair priority."

On the negative side, a multivendor installation requires giving all the different manufacturers time for preventive maintenance.

"You want to minimize your downtime," he said, and with a mixed shop you could have multiple outages which wouldn't occur with a single vendor.

Kennedy noted that a user must be shrewd in dealing with some vendors. "A vendor might look at your account and ask himself what he can get away with," he said, such as, "How demanding is this guy going to be about spare parts?" "Can I slip a trainee in on him as CE?" "Can I spread one CE over three accounts when he should really service only two?"

Contract terms are a plus in a multivendor shop, Kennedy stated, because you can probably get a performance clause stating that the equipment must function as well as an IBM 3330, for instance, or specify performance in terms of percentage of uptime over a period of time. "You can't get this from IBM or Burroughs," he said.

The main disadvantage of multivendor shops, of course, is problem resolution, Kennedy said. Among the problems encountered are the lack of diagnostics to test the system as a whole, problem isolation and availability of vendor personnel.

'Survival Plan'

Kennedy proposed a "survival plan" for multivendor installations:

- Plan ahead. Be aware of the possible contingencies and put safeguards in your contracts.
- Maintain good rapport with all vendors. Keep fingerpointing down, and involve the CEs in planning session and problem discussions so they feel they are a part of the operation.
- Keep the need to solve problems in focus. The proper attitude is one of "I don't care whose problem it is, I just want it solved. We'll deal with the red tape later."
- Be technically capable even if it means going to school. If you don't know how a piece of equipment works, you're leaving yourself open to a snow job.

Application Makes Key-Disk Work

CHICAGO – Going from keypunch to key-disk can bring notable productivity gains, but such gains are very dependent on the type of application, Philip Keirn of Arthur Andersen & Co. told a Caravan forum here.

In jobs without much skipping or duplicating, there probably won't be big gains, he said. So he advised DP managers evaluating such equipment to make test runs with their most important data entry applications.

In his own case, Keirn said his installation's data entry productivity with an Inforex 1302 key-disk system has been 20% to 25% above what it had been with IBM 029 keypunches since the conversion three years ago.

The Inforex system handles payroll, work in progress, accounts receivable, general accounting and some personnel applications, Keirn said. The tapes the system produces are processed on an IBM 370/145.

Keirn said his firm began investigating alternatives when the volume of work meant adding more keypunch operators and machines.

Other problems at the time, he noted, lay in balancing the number of keypunches and verifiers; scheduling the work and being sure it could be done, especially with emergency jobs; and in finding the physical room for card storage.

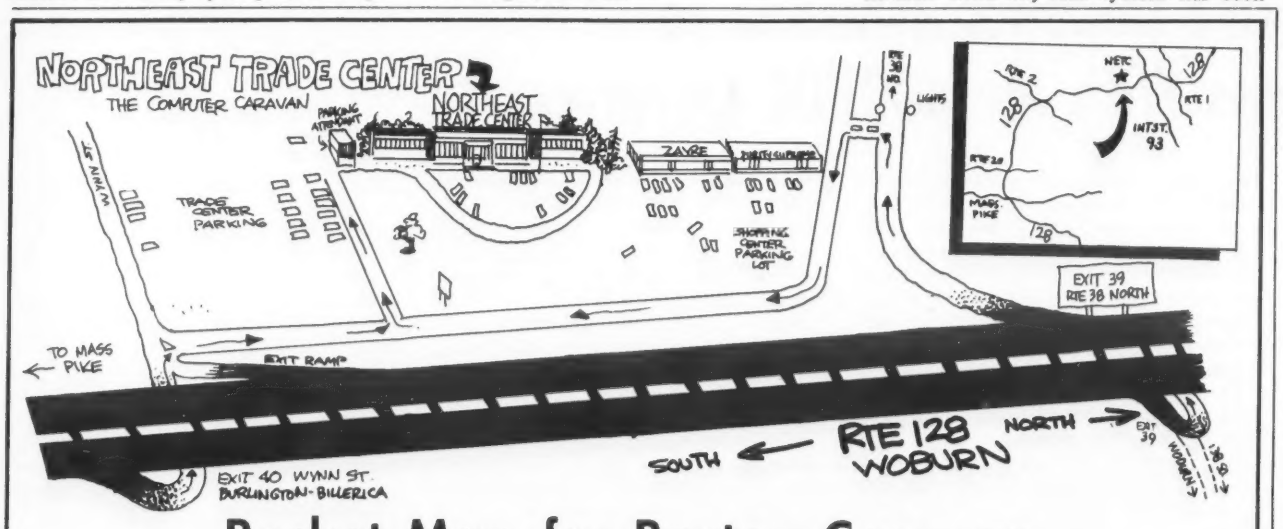
Looking at key-disk as an alternative to more keypunches and machines, the firm found the Inforex system – at $960/mo for eight stations – less expensive than the existing seven punches and four verifiers, which cost $990/mo.

Elimination of the cards and their necessary storage space was also a big help because of a tight space problem in his installation, Keirn added.

The fact that each key-disk station could be used as both "punch" and "verifier" made scheduling easier, he mentioned.

But key-disk systems have their disadvantages, Keirn stated. For example, if the system's controller goes down, none of the operators can do the work and "everybody whips out a copy of *Cosmopolitan.*"

But, "We've had good luck with the system and it hasn't been down much," Keirn concluded.



Pocket Map for Boston Caravan

The 1974 Computer Caravan is now in Boston for its three-day session from Monday, April 15, through Wednesday, April 17. This handy map will help you find your way to the Users' Forums (9:00 a.m. to 2:30 p.m. each day) and Exposition (10 a.m. – 6 p.m. daily).

Communications Key 170 Usage

(Continued from Page 1)

mote batch, time-sharing, deferred batch and transaction processing simultaneously.

But CDC has decided to price separately all software, including the operating system, and the NOS will probably cost the user about $8,000/mo. CDC justifies this move by claiming the user will have better options to either design his own software, purchase it from an independent vendor or buy canned or custom applications from CDC.

CDC maintains that by separately charging for all software it can cut up to 25% off the system price. A version of NOS can also be supplied to users of the 6000 and Cyber 70 systems.

First Front End

The 255X Series of Host Communication Processors (HCP) is CDC's first front-end communications processor line and the three unit series can be connected to CDC 6000, Cyber 70 and 170 systems.

The HCPs consist of a microprogrammable 16-bit word processor, a multiplexing subsystem and interfaces to terminal circuits and the host computer.

The user may write his own programs and develop HCP-resident routines that can provide data preprocessing and manipulation and data optimization prior to entry into the host processor. One HCP can interface to multiple processor units or multiple HCPs can be connected to a single host computer, according to CDC.

The communications processor in the HCP starts with a basic memory of 24K but can be expanded to 128K and the systems can support up to 256 lines.

In addition, the 256X Series of communication line adapters are used to interface the HCP to synchronous communications lines at speeds up to 56 kbit/sec.

They incorporate software selection of full duplex/half duplex, 5- to 8-bit code length (plus parity) and frame synchronization with Bell modem compatibility.

Terminals supported include those operating under TTY, IBM 2741, IBM 2780, IBM 3780 and CDC Mode 4 protocol. Prices of the HCPs will range in the $40,000 purchase area.

CDC also has interfaced its IBM plug-compatible double-density 3330-11-type disk drive and its series of 2,000 line/min printers to the Cyber 170 Series.

Rough pricing of the Cyber 170 series excluding software for typical configurations is: 172, $25,000/mo; 173, $41,000/mo; 174, $54,000/mo; and 175, $72,000/mo.

These prices compare on a somewhat similar scale to Cyber 70 systems: 72, $31,000/mo; 73, $44,000/mo; and 74 at $70,000/mo. System delivery of the Cyber 170s will begin in January 1975.

Mid-1960 Systems	Early-1970 Systems	Mid-1970 Systems
CDC 6200*	Cyber 72 (0.8)	Cyber 172 (1.2)
6400	Cyber 73 (1.0)	Cyber 173 (1.7)
6600	Cyber 74 (2.3)	Cyber 174 (2.4)
		Cyber 175 (4.6)
7600	Cyber 76 (12.0)**	No comparable model yet

*The Cyber 70 Series was basically the 6000 Series with some software improvements, and performance is the same as the 70 Series.
**The Cyber 76 will remain in production as is.

Here's how the Cyber 170s fit into the previous CDC line-up with an indication of relative speed, according to the firm, based on a Cyber 73 as (1.0) with all configurations using 131K words of 60-bit memory.

Goldwater, Koch Unite Forces On Privacy Bill

By E. Drake Lundell Jr.
Of the CW Staff

WASHINGTON, D.C. – Two privacy advocates from opposite ends of the political spectrum have drafted a new privacy bill that is given a good chance of success here.

Rep. Edward I. Koch, a liberal New York Democrat, and Rep. Barry M. Goldwater Jr., a conservative California Republican, introduced the measure last week indicating it would supercede earlier bills each had introduced separately.

The measure, as drafted by the congressmen, combines what many call the best of the previous two measures sponsored by the duo.

First, like an earlier Goldwater bill based on the HEW Advisory Committee Report on Privacy in data bank systems, the measure would allow anyone to inspect his record in a data bank and would require anyone keeping files of personal information to notify the individual involved.

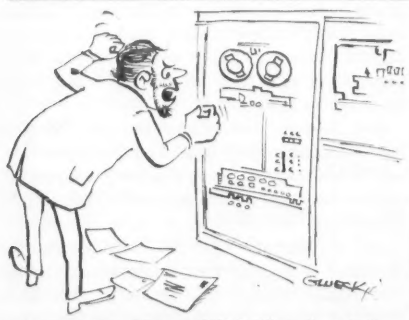
Individuals could block the transfer of information on themselves to third parties or for uses other than those intended and all filekeeping would be restricted to legitimate business or public purposes.

To oversee the operation of the act, the new bill borrows from an earlier Koch effort in that it would establish a federal privacy board made up of five members appointed by the President and confirmed by the Senate.

The measure – which would apply to both public and private data banks – would also prohibit the use of the Social Security Number as an identifier except where specifically allowed by law.

Sources here said perhaps the most significant feature about the new bill was its sponsorship which cuts clearly across party and ideological lines.

With both strong liberal support and conservative backing, several sources indicated the bill might have the best chance of any now being considered by the Congress.



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Really No-Fix Tickets

Now You See It, Now You Don't

WASHINGTON, D.C. – New parking tickets used by district police here may be easily deciphered by a computer system, but motorists are having trouble reading them.

A motorist pulling his carbon copy of a parking ticket off the windshield usually notices that the carbon ink quickly rubs off, a spokesman for the Central Violations Bureau commented.

Motorists are confused as to what the charge is and how much to pay. In addition, the preprinted serial number may also wear off. The result is long lines of people with blank tickets besieging the violations bureau daily.

While the tickets were put through a battery of tests before they were ordered, apparently no one tested the ink's staying power. Designed to be durable, the tickets were printed on a rubbery paper that is very strong, but so slippery that ink won't stay on it.

An IBM 370/145 has been programmed to determine the missing serial numbers by reading code-punched holes in the tickets. DP operators then recover the lost data.

Despite the problem, the district doesn't plan to change ticket suppliers. "IBM hasn't always received the bid to supply tickets," said a spokesman for the DP division of the violation bureau. "Since this is the only bad order in five or six bids won by IBM in the last 10 years, we don't view the incident as a basis for changing suppliers."

New tickets have been ordered, and IBM promises the next batch "will not have the same problem."

One million defective tickets were purchased by the Metropolitan Police Department for $30,000 under a contract with IBM. Police began issuing them Jan. 7.

Last Resort: 3 Alternative Plans

Viatron Close to Liquidation

By Ronald A. Frank
Of the CW Staff

BOSTON – Viatron Computer Systems, once the $39/mo darling of the terminal companies, may be close to final liquidation.

The company has been operating under Chapter 10 of the bankruptcy laws since 1971 under a court-appointed trustee, R. Robert Popeo. And the trustee has asked the U.S. District Court in Boston for a two-week extension to come up with a viable reorganization plan.

According to Popeo, three alternative plans are now under consideration, and if these are not feasible, liquidation of the company could be next. In the meantime, Viatron has "curtailed" its manufacturing and engineering operations, although marketing personnel are continuing to function, Popeo said.

"On the basis of the proposals we have received, there are three separate alternatives and we are considering each and every one of them," the trustee said. If none of these is practical, "we would then go into some form of liquidation even if it is a liquidation in the ordinary course of business," he said.

There is no requirement that the firm be liquidated by auction and inventory could be sold off "in the normal course of business" or it could be "an outright liquidation in bulk," the trustee explained.

Judge Anthony Julian had set April 5 as the deadline for the trustee to file a reorganization plan, but the request for a two-week extension was filed on the last day. The judge has not yet decided whether to grant the extension, but one source said it was considered *"pro forma."*

Support for users who still have Viatron equipment would be one of the reorganization goals and "every effort would be made" to continue some type of service, Popeo said.

All three alternatives provide for continuation of the firm, but the only question is how the creditors will be paid and the amount of working capital to be put into the company.

Experimental System Aids Evaluation Of MD Performance

(Related story on Page 7)

LOS ANGELES – An experimental computer system designed "to improve the performance of doctors" in hospital treatment is being developed at the University of Southern California (USC) School of Medicine here.

The system, which will be tried at the Los Angeles County-USC Medical Center for two years, will process the hospital records of approximately 6,500 patients admitted annually, according to a medical center spokesman. Information sought for the computer program will include the tests the physicians order for hospital patients and results, the adequacy of examinations and the length of the patient's stay.

The experimental program will be supported by a $150,000 grant from the Henry J. Kaiser Family Foundation.

USC Medical School Dean Dr. Franz K. Bauer said: "If this approach is successful, it will provide a way to improve care and lower costs at hospitals and clinics."

Program direction will be handled by Dr. Leona Miller of Pasadena, associate professor of medicine at USC, and Jack Goldstein of Los Angeles, a medical systems specialist.

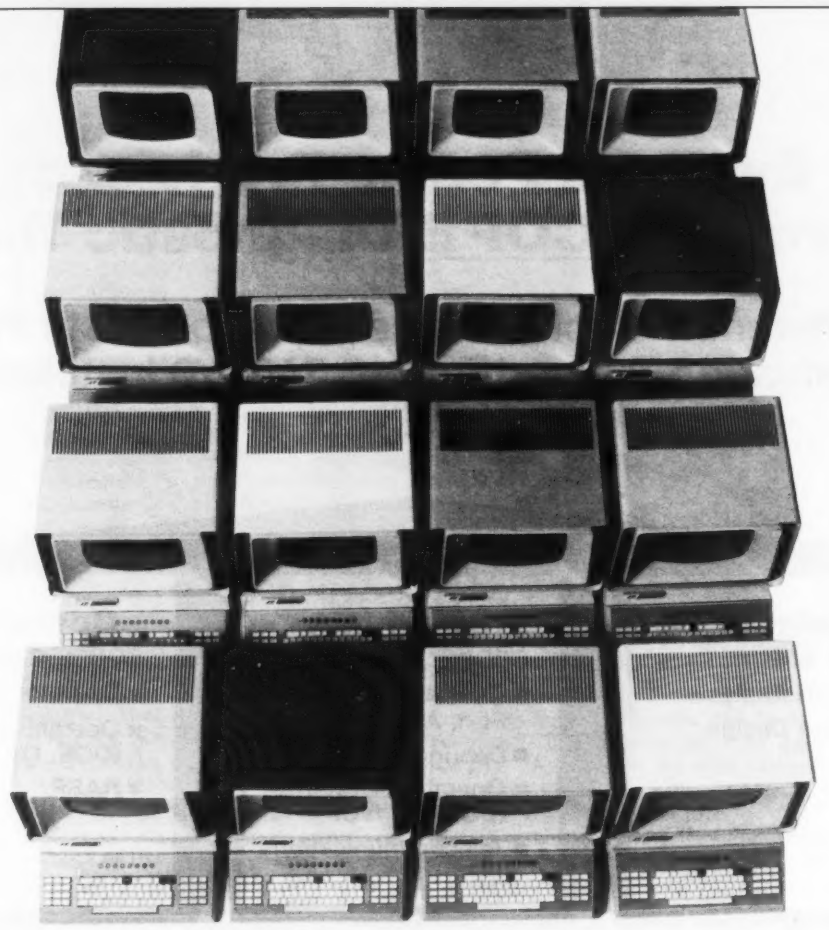
While recognizing that performance-evaluating systems are presently being experimented with at other medical centers, Miller pointed out that the USC system will be different. "We'll readily review any doctor's performance with him. We will determine if he is making adequate examinations, doing too few or too many diagnostic tests, or keeping his patients in the hospital too long. By going over this information on an individual basis, we will be able to immediately suggest improvement."

'Ride Me, I'm Clean'

DALLAS – The computer-controlled people movers used at the new Dallas-Fort Worth airport work well most of the time. There are the normal petty malfunctions that are to be expected with any automated system.

But several weeks ago one of the cars was missing. Although the computer indicated the car was en route carrying passengers, the vehicle was nowhere to be found.

As it turned out, the car apparently decided it needed a washing. Maintenance personnel finally located the wayward car after it had run itself through the wash cycle five times. Looking at the bright side, one technician remarked, "At least there were no passengers on board."



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Experimental DP 'Watchdog' For MDs Draws Mixed Reactions

By Alexander Dumas
Of the CW Staff

AKRON, Ohio – A proposed computer monitoring system to make sure doctors don't over- or undertreat Medicare and Medicaid patients has drawn mixed feelings from this state's doctors, according to system director Dr. Robert Clark of Akron.

The Federal Government spent $16 billion last year providing hospital health care for the elderly and poor enrolled in these federal programs. Congress has since added an amendment to the Social Security Act providing for a national, computerized watchdog system – with an experimental program operating in Ohio. The system will be disseminated throughout the individual states by Professional Standards Review Organizations (PSROs).

Under the experimental PSRO here, when a person enrolled in a federal program such as Medicare is admitted to a hospital, a questionnaire corresponding to the information stored in the computer is filled out and run through the machine. The computer then determines whether the admitting physician gave the right amount of preliminary tests to the patient. If not, the computer "kicks out" an exception report that must be administered. The same kind of report is generated when a patient has overstayed the "average" time for his particular illness and treatments.

Even though peer review is not a new concept – it has been operating in many hospitals throughout the country since the early 1960s – Clark said most doctors opposing the PSRO idea do not object to answering to their colleagues or having a computerized system.

"What they do object to," he continued, "is that PSROs have been made law. Both the AMA and the Ohio State Medical Association (Osma) hope that it will be repealed.

"Without sounding too uppity," he added, "the medical profession has always led the way as far as medical ethics has been concerned. But now the government wants to step in with a law that will fine physicians for providing what a consensus assesses as poor care or extending a patient's hospital stay. Many doctors are not happy about it."

However, because Osma realized peer review was "bound to happen," Clark said the organization began taking steps two years ago to set up a PSRO. The Ohio doctors decided the system would be most efficient by adapting it to computers. "Without aid of a computer," forecasted Clark, "doctors here will say they were keeping Medicare costs down, but somebody like Senator Kennedy in Washington might say costs are too high. With the computer, we will have the figures right in front of us."

Last year, the experimental program began in Ohio with 29 panels of specialists throughout the state drawing up criteria necessary for admitting a patient to a hospital, tests that should be administered in order to provide "good" versus "bad" care, and the average length of stays for certain types of treatments and sicknesses.

This information was programmed into an IBM 360/65 at Ohio State University and 26 terminals were placed in pilot hospitals.

Motorists Sizzle Over Ticket Plan Fizzle

By Nancy French
Special to Computerworld

COLUMBIA, Mo. – Data entry delays were causing people with upaid parking tickets duplication headaches. Everybody blamed the computer and unpaid tickets were costing the city money. But that's all changed now.

Last April when Columbia began computer-processing tickets – with an IBM 360/25 with 32K memory and IBM 2314 disk storage – it seemed like a pretty good system. Names of unpaid ticketholders were printed out by the computer and everyone received notification from the municipal court. The only problem was that people continued to be dunned for ticket payment even after they had paid their fines.

A furor arose, resulting in a suspension of issuing warrants for unpaid tickets.

Gary Howard of the city's data processing department explained that data entry was the culprit – municipal clerks were not getting information on paid tickets to data processing in time to delete the names before the next weekly printout was issued. Court clerks who routinely sent collection letters to everyone had no system of cross-reference.

The municipal court solved the problem by setting up a card file and using the computer printout as a backup.

Court Clerk Sheila Poe said copies of the parking tickets are filed by date. When the fines are paid, the tickets are pulled from the files and a copy is sent to data processing where three keypunch operators delete each name from the new printout, updated daily. Clerks sending notices doublecheck the card file to assure tickets have not been paid since the list was updated.

The printout is helpful to clerks who accept payment from people who have lost or forgotten their tickets. It provides a cross-reference by license plate number enabling clerks to pull tickets from the file.

County Hopes to Put Cap on Gas Siphoning

UNION COUNTY, N.J. – County officials here hope their data processing division can solve a ubiquitous problem that's taking its toll on the county operating budget – alleged employee siphoning of gas from county-owned cars.

A prime example, according to county spokesman William Maguire, was when one of the 223 county cars reportedly traveled 89 miles and consumed 127 gallons of gasoline – less than a mile per gallon!

"We've never had anything like this happen before," he said, adding that the problem was probably caused by the recent gas shortage. Maguire believes computer monitoring will act as a deterrent.

Haphazard recording of information and "messy" record-keeping was cited by the officials as holding up the programming of the county's IBM 360/30 to monitor the situation.

County DP manager James Delaney hopes to have the program completed by April 30. The monitoring system will be fashioned after one presently used by DP manager John Moody in nearby Paterson, he said. According to Delaney, Moody's system includes the average gas consumption figure for each municipal vehicle. "If this amount is excessivley exceeded," he continued, "the computer puts a 'flag' on the vehicle's driver."

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Model Cites Higher Statistics

Odds of Being Murdered Are Rising

By Nancy French
Special to Computerworld

BOSTON – An MIT mathematician has projected that the risk of being murdered in the U.S. is higher by thousands than people commonly think – even criminologists.

Arnold Barnett, who studied homocide rates in the nation's 50 largest cities, said his computer-based mathematical models indicated that one of every 32 children born this year in Boston, for example, and who continues to live in Boston, could be murdered.

In Atlanta, that rate increases to one of every 27 children born this year.

Speaking at a seminar arranged jointly by MIT's Operations Research Center and the Innovative Resource Planning in Urban Public Safety Systems Research Project, Barnett cited Atlanta where he compared the 250 people who were murdered in 1972 with the 500,000 people who were not murdered.

Although homocide statistics are accurate in counting murders, he said they are "misleading and unsatisfactory" as indicators of risk.

"The public policy implications of the climbing homocide rate make it extremely important that people have an accurate view of the magnitude of the problem," he said, stressing that his forecasts are based on the assumption that no change will occur in the present policy of "inaction."

Barnett said he originally believed there was a correlation between the demographic – population and racial composition – changes and the increasing homocide rate. This he disproved early in the study, and made no further attempt to explain what the causes of the soaring homocide rate actually were. The study was then confirmed to identifying numerically the risk of murder.

Among Barnett's findings:

- Specific city characteristics are surprisingly unimportant.
- The 50 cities studied seem to exhibit the same underlying trend.
- The view that the current problem is rooted in the high birth rate following World War II is shown to account for only 10% of the rise in murders.
- A calculation based on all major demographic changes between 1964 and 1972 confirms that a rise in homocide rates can be expected.

DP Figures in Betting Probe

NEW YORK – A computer has proven instrumental in analyzing betting patterns in an investigation of alleged race-fixing at Roosevelt and Yonkers raceways.

Agent Nicholas Gianturco presented his findings in the trial of 13 defendants accused of rigging races to win superfecta bets, in which the bettor must pick the first four hourses in their exact finishing order.

Gianturco said he examined over 11,000 Off-Track Betting Corp. documents and thousands of computer printouts in preparing an analysis of 40 races run between January 24 and April 13 of last year.

To illustrate analysis results, he selected as typical a superfecta race at Yonkers on Feb. 2.

For that race, 98 winning tickets were purchased at various off-track betting parlors. Gianturco testified that 65 of the 98 tickets were cashed by the alleged gambling ring.

The analysis established a betting pattern which, when combined with the race's outcome, provides evidence against three drivers in the race, Gianturco testified.

What You See Not What You Get

SYRACUSE, N.Y. – A stuck switch on an optical scanning unit used with an IBM 370/135 caused some problems during the recent report card distribution at Auburn High School here.

George Walton, manager of operations at the Onondaga Regional Computer Center, said the stuck switch allowed the system only to "see" and record the ten's place on grades and not the one's place.

"For example, if a teacher gave a student a grade of 77, only the first seven was picked up and the last was omitted. The computer would fill the empty one's place with a zero and the grade would be printed on the card as 70," he explained.

Walton said the problem that caused 1,000 separate errors was corrected in two days.

Two in the Hand...

LAS VEGAS – You're in a seven-card stud game of poker facing an oponent with a royal flush showing. You're one card away from another royal flush. What are the odds of two royal flushes in one poker hand?

Only 753,334,487 to one, according to a computer analysis that was made recently after two royal flushes actually appeared during one hand.

After experts – who noted that the odds of getting one royal flush in a game were 649,766 to one – said the odds on two in one hand were unknown, Dr. Allan Wilson of San Diego used a computer to set the cards straight.

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Course Deviates From Original Mapping

Computer Picks Power Line Route but No One's Happy

By Nancy French
Special to Computerworld

RICHMOND, Va. – In an effort to resolve a controversy over the location of a new high-voltage power line, the Virginia State Corporation Commission turned to a computerized feasibility study that produced a route no one wanted – not the environmentalists, not the landowners – and least of all, the power company.

At issue is a $23.2 million, 111-mile, 500,000 V line proposed by the Virginia Electric and Power Co. (Vepco) and the Potomac Edison Co. to service Fauquier County, Virginia, and eastern portions of West Virginia.

Although the computer-selected route for the power line closely follows the course mapped out by the two electric power companies, it deviates enough to require purchase of different parcels of land and completion of new surveys, according to Richard Rogers, the commission's general counsel.

To the power companies, this means higher costs.

Their chief engineer, Donald N. Rice, said at a commission hearing: "We believe that [the computer routes] tend in some measure to confirm Vepco's decision to route the lines across those general areas. We believe where they diverge, the computer-selected route is not preferable in any instance and the Vepco route is preferable in such instances . . . from both an economic and environmental point of view."

The study, completed by the combined efforts of Virginia Polytechnic Institute and State University and Technical Associates, Inc. of Richmond, considered the problems from three basic viewpoints: engineering, cost and environment.

Researchers used two IBM 370/158s with 2M bytes of core storage in one and 1.5M bytes in the second, working as a single system channel to channel. The machine accessed 20 spindles of IBM 3330 disk drives and five IBM 3420 tape drives.

Numerical values were assigned to various engineering and cost factors in 16 northern Virginia counties, further divided into about 80,000, 25-acre parcels, according to the project's director, Virginia Tech Professor Robert H. Giles Jr.

Then numerical values were assigned to about 100 environmental factors including registered federal and state historical sites, federal transmitter zones, airport flight lanes, existing scenic views, national parks and game lands, slopes of greater than 5% and residential areas.

These values were superimposed upon the first study to determine where the route should be altered to avoid encroaching upon the environment.

Philip Irwin, president of the Rappahannock League for Environmental Protection, opposes both the commission's plan and the power companies' plan, claiming the new line should be built parallel and adjacent to existing Vepco power lines rather than spreading the towers all over the counties.

"I think the computer program will be a useful tool in power line cases where there is no existing line to parallel or upgrade," Irwin said. But he said he rejects the computer's findings in the current case.

The computer picked the most economical route – which turned out to be $5 million cheaper than the power companies' favored route, according to Giles. The researchers determined there were no environmental conflicts with the cheapest route, so it was sent to the commission where no one now likes it.

More briefs for the case are due by May 1, and a decision is expected this summer.

Computer Turns Nutritionist

WAUKESHA, Wis. – You are what you eat, according to some nutritionists, and a computer here is going to decide just what you are.

Waukesha County residents will be able to participate in a nutrition project sponsored by the University of Wisconsin Extension this spring.

Participants will fill out a computer form listing all foods, including snacks, which they ate during one day. This information will be processed by the university computer and analyzed for 12 essential nutrients.

A printout will be mailed to each person, indicating what percentage of the Recommended Daily Allowance of those 12 nutrients he has eaten.

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Hot Line on Building Issues Set Up

By Toni Wiseman
Of the CW Staff

LOS ANGELES – A network of terminals is being implemented here to solve some of the bureaucratic problems plaguing big cities.

The Proposed Citizens Complaint System will be tested in July by the Data Service Bureau, which provides DP services for all city council-controlled departments.

The test portion, according to bureau director Tug Tamaru, will deal with complaints relating to buildings, such as codes, permits and inspections. The system is designed to make it easier for the public to find out what action has been taken on a complaint or whether the same complaint has already been filed or dealt with.

Los Angeles citizens will be able to write or phone Councilman Billy Mills' office, where a CRT and a 2741-type typewriter/printer will be on-line to the bureau's dual 370/155s.

As Mills' secretary processes a complaint, a copy will be printed out in the building department office. The computer, Tamaru said, will control all switching to ensure that the data base is updated and the building office is alerted to all complaints.

Once a complaint is dealt with, the building manager can upate the data base. Any inquiries pertaining to that complaint will then be answered with a message that the situation has been remedied. The complaint will, however, remain in the data base which, Tamaru said, will be a rich source of data for statistical and planning purposes.

If the project is a success, he said, the system will be extended to 10 or 12 departments, including public works, traffic, sanitation and fire. This will include placing terminals in some 16 offices including the mayor's, he said.

"The data base will enable city planners to determine the types of problems and locations where they arise throughout the city," Tamaru said. "This data will aid city management in making legislative decisions."

West Coast Wrapup

Hearing Set on Use Of SSN as UID

SACRAMENTO, Calif. – A hearing will be held April 30 in the Assembly Judiciary Committee on a bill intended to discourage the use of Social Security Numbers as universal identifiers in California.

The bill, AB 2802, was introduced by Assemblyman William T. Bagley (R-San Rafael), who was a member of the Secretary's Advisory Committee on Automated Personal Data Systems, U.S. Department of Health, Education & Welfare.

Bagley said the bill is intended to "discourage and eventually prohibit organizations, both public and private, from using Social Security Numbers to identify individuals by establishing a system of registration and regulation."

The bill would require any organization using the numbers to identify individuals to register with the Department of Consumer Affairs and state whether such use is mandatory.

Then, when the SSN is requested, the person asked must be told whether it is mandatory. If it is, he must be told why.

Persons who have previously supplied their SSN where it is not mandatory may upon written request have their SSN removed from their files.

No state agency may convert to the use of the SSN unless authorized by law.

Finally, all organizations presently using SSNs must convert to some independent numerical system within three years unless the use is sanctioned by federal or state law.

Privacy Bill Change Seen

SACRAMENTO, Calif. – A bill intended to protect the individual privacy of Californians is expected to be amended this month prior to a hearing May 2 before the Senate Governmental Organization Committee.

Several data processing groups have been trying to modify the bill, which was introduced by assemblymen William T. Bagley and Mike Antonovich.

The bill would restrict the use and transfer of personal data used in automated personal data systems.

Penalties would be imposed for unauthorized invasion of an individual's privacy, improper dissemination of personal information and failure to file a public declaration of the existence and nature of a personal data record system.

Teale Program Move Speeded

SACRAMENTO, Calif. – An Assembly bill that would have delayed conversion of the Department of General Services computer programs at the new Stephen P. Teale Center has been amended to provide an earlier transition.

The bill, sponsored by assemblyman Willie Brown, would have delayed for a year the transfer of the General Services programs.

Following a hearing, however, it was agreed the transfer could begin in November.

It will begin with a simulated run in October of the programs relating to legislative printing, which must be accomplished in a timely fashion to meet constitutional requirements.

Following a simulation in October, the Teale Center will take over the full General Services legislative printing operation in November.

The Old DP 'Professor'

Special to Computerworld

SEATTLE – Consider these two situations:

- The medical student talks to a patient about his symptoms and medical history. The patient, a computer, is programmed to simulate someone needing care, as a learning aid for medical students.
- The rural doctor, perplexed by a series of surprising symptoms, goes to a remote terminal and dials up a medical text reference service which supplements his personal library.

The first scenario happens regularly at the University of Washington Learning Resources Center here. The second is the goal of a $49,500 grant recently received by the center to expand the use of teaching aids in the medical environment.

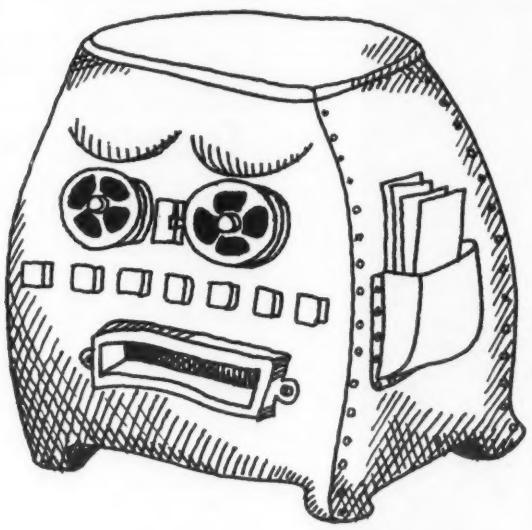
Dr. James MacArthur, assistant director of the center, said the grant, from the Foundation for Medical Education, a private endowment foundation, is designed to put medical learning technology into the community as a practical tool.

Teaching machines should supplement normal teaching methods, not replace them, MacArthur feels. But he also cited data which indicates that specialized machine learning can be conducted for $1.75/hr, about a fourth the cost of traditional techniques.

MacArthur put no timetable on when the technology could be used in the field.

would you let an employee loaf on the job?

what about your computer?



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A.O. Smith
DATA SYSTEMS DIVISION

Good Documentation Vital to Communications Net

By Patrick Ward
Of the CW Staff

BOSTON – "Good, definitive documentation of what you want to do" is the most important part of ordering and contracting for a network, according to Gary Audin, director of system projects for Informatic's Communication Systems Division.

Acquiring a data collection, on-line inquiry or message-switching system is a cycle, Audin said in an interview here. If a DP manager has good documentation for each step, it becomes much easier for him to answer questions in his own firm, compare vendor proposals and check the performance of the installed system before accepting it, Audin stated.

In the Beginning

System definition starts the cycle, Audin said. Here the DP manager tells management about the tangible and intangible benefits the system could bring the user department and the company.

But the DP people must be prepared to answer management questions about their problem definition, current system capabilities, new system requirements, interfaces with other departments and systems and alternate solutions, Audin stated.

The problem definition may be too broad, calling for too ambitious plans, Audin cautioned. DP managers sometimes "build empires out of things they think the user department wants," he remarked.

The user in most cases knows what he wants the proposed system to do, but doesn't know how to bring it to life, Audin said. The DP man is in the opposite position, he noted.

The user is actually the best person to lead the writing of specifications and business plans, Audin added. The user's role is becoming more important now that many of the users' simpler functions may have already been automated, and computerization is beginning to reach into his more complex tasks.

Audin recommended a user project manager, perhaps working with a DP project manager. With a lesser role, the user is likely to wind up a "follower" and not get the best system he could.

As for alternate solutions, some users might be better off with a time and motion study than automating their applications, Audin stated.

A DP manager must be ready to show his firm's management that he has considered alternate solutions and be able to produce positive evidence why they can't meet the need, he said.

In filling a need, Audin warned, DP people are sometimes "taken with one or two terminal types and build the system from there."

Instead, the DP staff should begin looking not only at different brands but different types of terminals. The DP people should check how closely each type of equipment can meet the user's objectives and how much budget it takes.

Repeat this process at least once, Audin advised.

Involved User

And if the user is involved at this stage, he stressed, he will become much more sophisticated about technical problems later on.

In the business plan, closely related to the system definition, the DP staff presents a cost/benefit analysis of the proposed system, and also goes into the time it will take to get the system up and running, the extra facilities it may need, and its probable lifespan.

Executives are more likely to approve a proposed system if the DP department provides for cutoff points even after the business plan is approved, Audin noted.

External cost estimates are usually off by 10% to 30%, but internal cost estimates may be 100% to 200% off, Audin declared.

One reason for this, he explained, is that many people who are procuring a system have never done it before. Often the user thinks the vendor will do most of the work and has little idea how much responsibility is left in his hands.

It's not a bad idea for the DP department to hire a former vendor project

User Casebook

manager to acquire the system, because he will be much more experienced than anyone else on the customer staff, Audin observed.

The next step is the preliminary design stage. The functional specifications drawn here define the entire scope of the job, and how the proposed system is to interface to departments, people, machines and networks.

"It is the single place where the user gets to say what he wants specifically," Audin said. And it is the user's first chance to put down the criteria that will be necessary for the acceptance of the system.

These functional specifications will later serve as the technical portion of the request for proposal (RFP). A common mistake here, Audin stressed, is that instead of telling a vendor what capability to provide, the specifications say how to do it.

What Do You Think

Let each vendor come up with his own solution and explain it in his RFP, Audin said. The DP staff can then choose on a quantitative, not a qualitative basis, among the vendors that meet the requirements.

In the preliminary specifications, Audin said, the user should also give much attention to what his criteria for acceptance will be, again putting these in as quantitative a manner as possible.

List things that can be measured, like volume requirements, functional requirements and accountability (data security), Audin urged.

The RFP incorporates the functional specifications, plus management specifications. These include scheduling, definition of deliverables, vendor/customer responsibilities, acceptance criteria and payment schedule.

The user may still not be participating enough at this stage, Audin said. Another problem is that the vendor may be required to produce more reports than are necessary. Users may underestimate this expense, he added.

The contract itself combines the functional specifications and management specifications and adds a legal document on terms and conditions, Audin continued.

The final step before implementation is to convert functional specifications into technical specifications that cover "every last detail of what the system is supposed to do," Audin emphasized.

They will be the final criteria for accepting or rejecting the system, he concluded.

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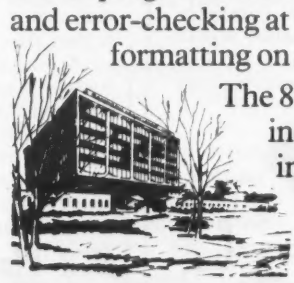

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Editorial

Let Us Now Praise CPP

The formal announcement was unnecessary: Computer People for Peace (CPP) had formally disbanded, or at least had ceased to function under the current name.

The first reaction to the demise of this group was regret. Its goals had been admirable: peace, equality for all workers, socially oriented applications of computer technology.

While these goals may be carried out by Science for the People [CW, March 20], a word of praise is in order for CPP.

It was through its unorthodox, though sometimes admittedly illegal, means that certain injustices were exposed. It was partially through CPP's energy that privacy was pushed into the limelight four years ago.

Whether the demise is attributable to the unpleasant manner in which it conveyed a necessary message ("the end does not justify the means") is academic, for some might argue CPP was fighting fire with fire.

But we can look back at the beginning of CPP's end.

Atlantic City, 1971: Spring Joint Computer Conference.

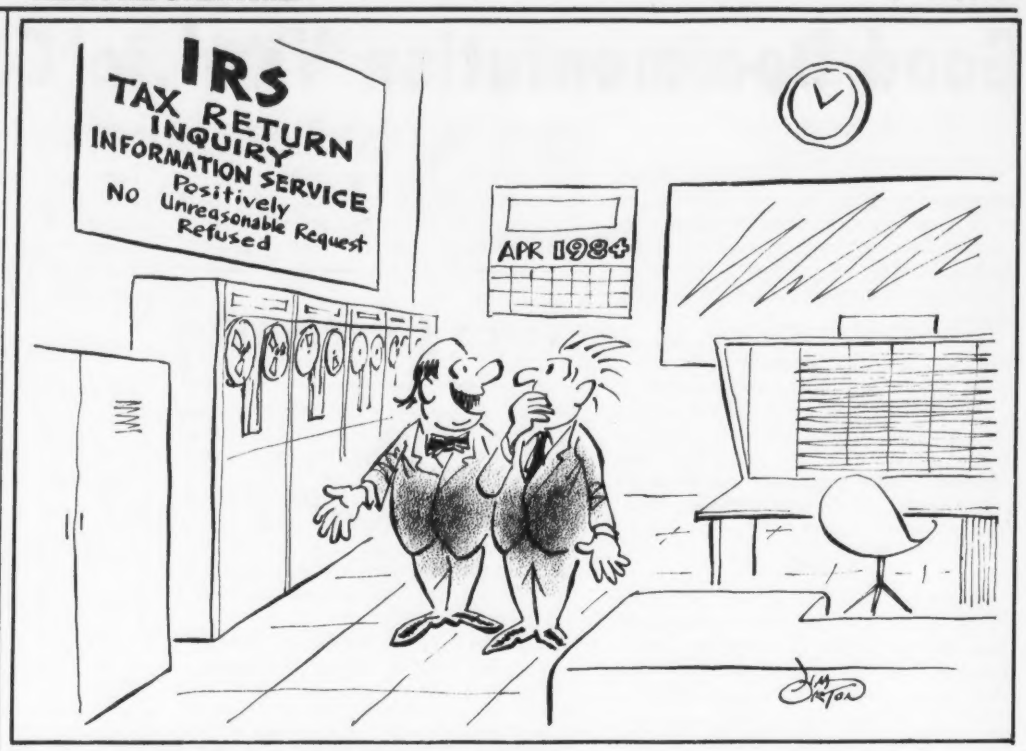
CPP was given an opportunity to run an entire program parallel to SJCC's, and it was given facilities and publicity. The program turned into formalized griping sessions, some of which had direct bearing on computer users and others whose relevance was incidental.

But the program itself was not to blame. The small audiences attracted by the program was evidence enough of the apathy of the computer community to the CPP.

But CPP has left its impact on the media. More and more, we are seeing (and writing) articles on social *applications* of computers – medicine and the administration of hospitals; factory automation; criminal systems.

We were not always in agreement with the disruptive means CPP used to convey its message, though we realized the group otherwise might not have attracted attention.

And while it may be some time before CPP's real impact can be assessed, we suspect it deserves at least some of the credit for the current interest in protecting individual rights in privacy, credit reporting and legal computer systems.



'No Kidding—Some Nut Called Yesterday to Look at His OWN File'

Letters to the Editor

Suspect List Quite Proper

What tortuous feat of logic leads Michael Sorkin to conclude that maintenance of a list of suspects for crimes, in Iowa or anywhere else, is an improper activity of law enforcement agencies [CW, March 6]? It never ceases to amaze me that all want their freedom protected but some expect it will protect itself.

If one is going to logically investigate and solve crimes, then one must mentally or otherwise process data – clues, correlating patterns of activity, descriptors, etc. One must perform logic, induction and deduction. If one wants this process performed effectively, efficiently, and objectively (and I would assume only criminals don't), then use of the most effective tools for processing data and performing logic would be desirable.

Does Sorkin, or anyone else, actually expect an investigator to solve a crime or a series of related crimes, without ever building up a list of suspects? Does he think that crimes are solved by a sudden flash of insight or ESP, without retrieval of associatable data, lengthy tracking down of connections, lots of drudgery and formulating and testing of uncountable complex hypotheses? Or does he simply think that job should be impeded as much as possible?

It's about time the criers of a data bank doomsday faced up to the simple facts:

- Data banks can be safer when they are in computers than when they are in file cabinets, notebooks, people's heads or backs of envelopes, because computers are auditable, computers have no ulterior motives, and computers are just plain difficult for an average person to pry open.
- Computers are more effective, by many orders of magnitude, than antiquated manual methods for associating and searching data.

Data is knowledge. It is only *some actions taken* from knowledge, not knowledge itself, that can be validly condemned.

C.W. Swonger
Elma, N.Y.

Our position on suspect lists and similar working documents is that they should *never* be entered into a data bank, whether computerized or not. The detective's pocket notebook, yes; accessible files, no.

I invite your comment on what to do about erasing such material, if it nevertheless is placed in a data bank. HG

NCR Plaudits

The survey on non-IBM users [CW, March 27] is far insufficient in order to express the truth about the various computer manufacturers written about.

For two and a half years we have been working with an NCR Century 100 and not only can we deny the statements that are expressed in this article about that manufacturer but we would have no trouble finding a dozen local users who are very satisfied with hardware and software services that are supplied by that company.

Mark Andre, President
Codapro Corp.
Plainview, N.Y.

Quite Compatible

The April 3 issue contains a letter from Evelyn Forrest Thomas relative to her expectations in upgrading from the NCR Century 100 to the NCR Century 101, along with *Computerworld's* reply requesting another letter *after* her experience. The following is my *actual* experience in changing an NCR Century 100 to an NCR Century 200. Both configurations were 32K systems with card punch and two tape drives. The card punch and tapes were retained, but the printer, disk drives and processor were changed.

On Wednesday, Jan. 17, 1973, we ran normal production on the Century 100. At 8 a.m. on Thursday, Jan. 18, we uncabled the 100, removed it from the room and moved in the 200. We wired it in on Friday and operated on Saturday, Jan. 20, 1973.

No control cards were changed and no programs were recompiled. The disk packs and tapes from the 100 were mounted on the 200 and we operated immediately at twice the speed without incident.

When routine maintenance recompilation of any program was done after the switch, the 200 was specified in order to take advantage of some of the 200's additional features, but plainly, there is no compatibility problem.

Keith G. Bates
Assistant Director of Finance
for Data Processing
Housing Authority
Atlanta, Ga.

Four-Stripe Frankenstein

One of the newer proposals of our fantasy-ridden racket is as follows: take a "respectable" computer system, a 370/145 or an 1106; in the computer science laboratory, remove the pretty casings and discard the expensive console. Now, carefully separate the exposed subsystems and dissect the main memory. Remove and destroy commands such as double-precision and floating-point arithmetic, complicated masking and perhaps ordinary multiply. Cut all words in half.

Procure from a specialized, and unfortunately enormously expensive, manufacturer like Western Electric a supply of connectors. These are long conductor bundles, with necessary booster amplifiers and pulse reshapers, the novel feature of which is a box rather similar to IMP, used in the Arpa network (an almost equally amusing proposal which is expected to begin doing useful work in the mid-Eighties). This box performs, among many others, the following random functions: DISCONNECT, SCRAMBLE, ERROR BURST, CROSSTALK and FAIL RELOAD. Additionally, it provides a steady and reliable input to NEWBILL, an Orwellian invoice system which charges in inverse proportion to throughput.

The connectors do not have a generic name. It has been suggested that the IMP-like box be christened DEMON, but the analogy with Maxwell's Demon seems antithetic, and no suitable acronym has yet evolved.

Using these connectors, the computing system is now reassembled. The missing console is replaced by small flip-tab octal or hexadecimal units, and slowdown modifications are imposed on major peripherals. High-speed card readers and punches are replaced by inexpensive paper tape equipment.

Software projects are then to begin. These are especially attractive to the original sponsors, since encouragement of cottage industry is one of the New Nixon methods of promoting science/engineering progress. The chief focus is necessarily on the excursions introduced by the new connector technology. Automatic replication, in which all throughput is repeated several hundred times, until two results finally agree, is the major new interface with the hardware, and will be imbedded in an Intel-type OS/VS Level 84 Release 37 operating system. Programming teams will also provide PL/S and Algol 80.

The proposal envisages an MQ [monster quotient, referring to the pioneering reassembly project described by M.W. Shelley] substantially above 0.01. That is, sponsors believe useful work can be produced exceeding 1% of that performed by the predissection computer.

Early Navy support is now being supplemented by major minicomputer manufacturers, who clearly hope to see many respectable computer systems similarly cut up.

Herb Grosch

Steering Committee Offers Unique Control Over DP

By Louis Fried
Special to Computerworld

There is something different about data processing. In fact, the DP function in a company is almost like a company within a company.

It is a highly complex, technically oriented function that has counterparts to all the functions (engineering, production, quality control, etc.) of a manufacturing company. It operates both a job shop and a continuous production shop. It provides services to all segments of the organization within which it resides.

In many ways, the data processing operation of a company is an alien body within the host organization which, if not controlled, can destroy its host. There have been too many instances of runaway DP costs due to lack of control or executive "computer fever."

Because of its unusual character, DP requires unique control methods which would not be applied to any other internal function. This unique control can best be applied through use of a device called a steering committee.

A steering committee is a group acting in an advisory and top-level decision-making capacity to a function for which it is not directly responsible. As a group it is responsible to the top level of the organization but is delegated some specific executive powers.

The steering committee, in effect, operates as a board of directors. While not normally making detailed operating decisions, the committee acts to control expenses, establish priorities and make economic and policy decisions.

The difference between the steering committee and the board of directors is that a board would normally be contributing to the *expansion* of an organization, whereas the steering committee has as its objective the *limiting* and control of DP costs. Once the decision is made to limit DP costs, then the committee has created for itself the problem of allocating the distribution of a limited and expensive resource.

The steering committee therefore also

Viewpoint

becomes a vehicle for resolving the political problems arising from contention over the limited resources and from the overlapping impact of new systems.

Proper control of the DP function requires two types of steering committees. The permanent steering committee is responsible for the overall control of the continuing operation of the DP function. The temporary or project steering committee is responsible for the successful completion of individual projects.

In recognition of the fact that the cost of data processing may run as high as 3% or more of the gross income of many companies, the permanent steering committee should be composed of the president or chief operating officer of the company and those executives reporting directly to him who are users or potential users of the DP function. Regardless of his reporting relationship, the DP manager should also be a member of this steering committee.

Duties of the permanent steering committee include:

- Using its knowledge of the company's strategic and tactical plans to determine the level of DP expenditure and capability it desires.
- Approve specific proposals for acquisition of major DP equipment.
- Approve long- and short-range DP plans.
- Determine whether projects are to be done. This determination is to be made on the basis of payback, availability of alternative methods, anticipated impact on the organization, business or personnel and conformity to corporate long-range plans.
- Determine project priorities.
- Review and approve cost allocation methods.
- Review project progress.
- At specific decision points, determine whether projects should be continued or abandoned.

In contrast with the permanent steering committee, the project steering committee is established to control a specific job. This committee should be structured so the chairman has direct management responsibility for the success of the project.

Members should consist of the executives responsible for other groups in the organization that may be impacted by the system, managers of the user functions that will retain operational system responsibility, the DP manager and the DP project manager.

Functions of the project steering committee include:

- Coordinating and establishing the schedule for project tasks and segments. Segments of the project should be constructed so that decisions about continuing the project can be clearly determined at several successive checkpoints.
- Monitoring project progress by reviewing periodic reports from the development team.
- Assuring the proper resources for successful completion of the project.
- Resolving "territorial" conflicts between various users and between contributing members of the development team.
- Planning, scheduling and obtaining resources necessary for conversion to the new system.
- Making major systems design and economic decisions.
- Providing management direction to the DP project manager.

The success of this committee depends largely on the clear understanding that the chairman is directly responsible to corporate management for the success of the project.

The project steering committee provides the DP manager with a major benefit. By clearly designating the user as having total responsibility for the successful implementation of the system, the presssure on the DP manager is restricted to its rightful area – that of providing the DP support functions within the total context of the implementation project.

The user, however, also achieves major benefits. Steering committee reviews assure that the systems design specifications meet user requirements, that adequate acceptance testing is performed, that the proper resources are available at the right time and that a feasible schedule for conversion is planned. In addition, the user retains cost control of the project by a clear insight into project expenses as they occur.

Louis Fried is vice-president for management services at Pioneer National Title Insurance, Los Angeles, Calif.

Some Light Shed on Question of Cleaning Dirty Files

The responses from readers about whether clean files were possible [Taylor Report, CW, March 13] varied from a flat "Yes" to a straight "No."

The "Yes" answers on the whole indicated the readers had either not appreciated the difference between the two Dilks identifications (only the last names – not even the initials – were the same on the two addresses), or they were following on the implication in the Dilks note that keeping the *Computerworld* files "clean" would somehow have prevented Dilks from receiving a solicitation at home when he subscribed in the office.

The "No" answers similarly seemed to be based upon the idea that since the only item in common was the name Dilks, it was obviously impossible to stop that duplication – and these readers seemed to say that since this particular duplication could not be stopped, no cleaning was worthwhile.

The Taylor Report
By
Alan Taylor, CDP

A common thread through both the "Yes" and "No" answers seemed to be a general lack of understanding of the file-cleaning techniques available, and their costs and efficiencies.

One reader who is in the "cleaning game" gave a particularly good exposition of the file-cleaning process itself. Bob Wargo of Colonial Penn, Philadelphia, sent a sample printout of a computer run between two files which produces a list of possible duplicates. Then a person reviews the list to make the final decision.

Generally the first step is to sort out possible duplicates within a particular geographic area – normally a single Zip Code. Then the duplicate listings are produced. The Colonial Penn listing showed 17 sets of potential duplicates, some of which are shown in the figure above.

Perhaps the most interesting case is whether S LAOMBARDI of 239 RIVER ROAD is the same person as S LOMBARDI of 239 IVER ROAD. On the surface there is no question that a machine-like intelligence, unless very expensively programmed and data-filled, should not have been able to even associate these two names.

Like the Dilks case, they had little in common beyond the house number, and the initial "S." Yet they were associated, and would probably be classified as duplicates by the human reviewer.

Wargo did not specify how these items were associated, but the method must be based upon some mechanical relationships between the words LAOMBARDI and LOMBARDI and RIVER and IVER, together with the use of the matching of the two house numbers.

Put that way, the technical problem becomes fairly simple – the number of letters in matching strings, or some such relationship, is noted as being over or under some threshold. The name LAOMBARDI may not be identical to LOMBARDI, but they have two identical strings – "L" and "OMBARDI" – which make up 100% of one of the names.

This is defined as being over the threshold and, in conjunction with the over-the-threshold count of IVER and RIVER (which again have one common string that is 100% of the smaller version) and the same household numbers, is marked out for human review.

So while this technique does not cope with the "home address/office address" problem Dilks brought up, it does go further than many people thought was practical.

Confidentiality Possible

Max Eveleth, of Urban Data Processing, Arlington, Mass., cleared up another point – the problem of how or where cleaning of the files could be accomplished when the ownership of the files was not the same. A number of respondents insisted that in this case the confidentiality of the two records being compared could not be maintained.

Therefore, cleaning the product of multiple ownership files was not thought possible.

WILLARD K KELLER	252 MCFADYEN DR
ROBERTA Z KELLER	252 MC FADIEN DR
JOHN KRUMME	BOX 405
KRUMME CONST CO	JOHN KRUMME
S LAOMBARDI	239 RIVER RD
S LOMBARDI	239 IVER RD
JEAN LISANTE	3654 DRAYTON LA
MRS JEAN LISANANTE	3654 DRAYTON LA

The partial printout shows the type of duplicate names that can be associated in a computer operation, even though duplications are not absolute.

Use Third Party

Eveleth pointed out that it is not at all uncommon for list owners to allow their lists to be matched against other in-house lists by having the work performed by a neutral third party.

Technically, Eveleth pointed out, it is not a perfect solution but it is one that works, because it is in the business interest of the third party to protect confidentiality, and because fake names that are always included on such lists will soon give the game away if he doesn't keep the faith.

The problem of the economics also received some illumination. Don Wszolek, of Magi in Elmsford, N.Y., admitted that when mailings are small and rented files come from diverse interest groups, "then maybe it doesn't pay to undupe." Otherwise, he said, in almost all cases promotional mailings should be unduped.

Susan H. Lewis of Arthur D. Little, Cambridge, Mass., took an opposite point of view. She pointed out that one has to consider the cost of the operation itself, the value of the duplicate that is found and the cost of losing the marketing opportunity of any false drops. These costs, she said, have to be compared with the value of removing a duplicate from a list, and "it is hard to believe that the value of the culled duplicates will be greater than the costs."

Unfortunately, neither Lewis nor Wszolek gave figures to back up their positions.

In fact, the only set of figures dealing with cost that did come in was from Wargo. He quotes his firm's in-house Merge-Purge charge as $2.50/thousand names, which amounts to 2% of the cost of mailing (which he gives as $125/1,000).

From these figures he concluded that 2% of the names should be diagnosed as duplicates before the cost could be directly recovered – and he pointed out that in his shop the duplicate ratios have ranged from a low of 6% to a high of 30%.

These figures run counter to Lewis's assumption, except that they do not take into account the problem of false drops.

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IRS Puts Damper on Tax Breaks for User Groups

By Mark E. Battersby
Special to Computerworld

Today, the exchange of current scientific and technical data is not only an accepted way of life but is also virtually a necessity. More and more computer users have begun exchanging such data with other users of the same types of equipment. In many cases, this exchange of information has reached the point where a loose type of organization has actually been formed. Generally, these organizations have the approval, if not outright support, of the computer manufacturer.

Unfortunately, the Internal Revenue Service takes a dim view of such organizations and has ruled they may not be treated as exempt from federal income taxes. The IRS ruling raises the important questions of whether such an organization should qualify as tax-exempt under the tax law.

Consider one such organization.

The organization, which shall remain nameless, is a membership association devoted to developing and exchanging data among users of a specific type of computer. The organization also serves as a liaison between the actual users and the computer manufacturer.

This organization conducts regular meetings and even provides periodic seminars at which operational and technical problems relating to the use of this computer are discussed. Representatives of the manufacturer are regularly invited to attend these functions to answer questions concerning the computers' operation.

Commentary

One of the more important functions of this organization is to publish reports of its meetings and seminars. These reports are distributed to members and even circulated among interested nonmembers. The organization also publishes a monthly newsletter to keep members informed of current technical data of special interest under the existing circumstances. The organization is serving the private interest of its members rather than a public interest.

Thus, when a similar situation was presented to the Internal Revenue Service for an opinion, it had no alternative but to rule that associations whose memberships are limited to organizations that own, rent, or use specific types of computers – whose activities are designed to keep members informed of current scientific and technical data of specific interest to them as users of that type of computer – are not tax-exempt.

The IRS ruling and the tax law have pretty well closed the door on tax-exempt status for organizations such as my example. It now appears that fiscal tax planning is the only hope.

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Letters to the Editor

Reader Raps IBM Education Marketing Policies

Re the article on "IBM Key School Pacts Bared" [CW, April 3]:

Several years ago, our company attempted to sell a Duplex 7094 computer system to the city school system of the City of New York from the University of California. This particular machine was purchased under an IBM educational allowance program.

IBM refused to allow this sale to occur without the University of California repaying IBM its educational allowance discount, even though the machine was eventually to be used by the City of New York in its school system.

It must be recognized that at that time the University of California obtained competitive CDC equipment. IBM was very disturbed and did everything it could not to allow it to get out of its owned system.

The University of California even offered to assist the City of New York in the installation of this computer within the setup, as it was a very large-scale communication system. IBM refused to allow this to happen under its educational discount policy.

IBM's educational discount policy did more to hamper than help the progress of computer hardware technology in the education centers of the U.S. Its only objective was to lock in specific universities. I consider this a predatory marketing practice.

Thomas E. Doyle
George S. McLaughlin Associates, Inc.
Summit, N.J.

User Affirms NCR Compatibility

I read with interest the article on small systems users [CW, March 27] and the follow-up letter of Evelyn Forrest Thomas [CW, April 3].

While I do not echo the anti-IBM attitude, I do believe the conclusion (real or implied) of NCR was based on an extremely small sampling.

The response to the letter was also revealing, especially the exclamation mark in the last sentence.

I was an NCR Century 100 user for over three years, and in January 1974 I upgraded to a Century 101 with larger memory and the larger disk.

It is true that no reprogramming was required. The payroll system ran exactly as it did on the Century 100. The remaining programs were recompiled to take advantage of the increased memory size and the increased disk capacity. This amounted to repunching two cards for each file in each program. The program coding remained exactly as it was.

Easy? The Century 100 was removed Dec. 26, 1973, and the Century 101 was installed and in full operation by Dec. 29, 1973. We were completely on schedule by Jan. 9, 1974. We required no parallel runs, no service bureau, and no outside help, even from NCR.

While NCR may have faults, living up to the claim of compatibility is not one of them.

Give credit where credit is due.

E.E. Smith
Manager, Data Processing
E.D. Etnyre & Co.
Oregon, Ill.

Thank you for telling about an actual experience. There are often horrid failures at upgrade time, and I do not regret warning novice small system users. HG

Computerworld welcomes comments from its readers. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

Job Accounting Tops List

70% Rate CPE Work Useful, Tools Generally Good

By Don Leavitt
Of the CW Staff

PHOENIX – Very few users answering a recent survey on computer performance evaluation (CPE) and improvement tools reported truly significant improvements as a result of their efforts, but 70% still said they thought the effort was worthwhile.

The survey was conducted by EDP Performance Review (*EDP/PR*), a monthly devoted to CPE, and covered hardware monitors, software monitors, job accounting, application program optimizers or analyzers, operations scheduling, simulation and benchmarks.

Lack of Standards

Many users reported good results but others were less sure of the value of the effort. The lack of standards was seen as a very real problem, according to *EDP/PR* editor Phillip C. Howard.

Many user comments reflected that problem, he said, citing one user's plaint: "There is no clear definition of good performance such as ratios of CPU, memory and I/O utilization."

Despite that concern, users – particularly those who have set up formal programs for CPE – rated almost all the techniques as good. The one exception was operations scheduling which earned no better than a fair rating from the responders.

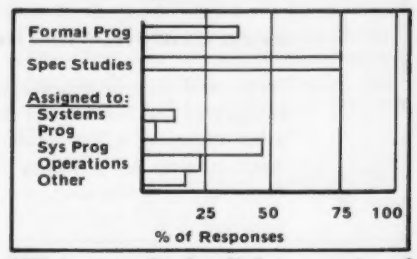
Job accounting was used by 80% of the sites and benchmarks by 76%, to lead the "current use" list by a considerable margin. Software monitors and scheduling tools, both manual and computer-based, were used by slightly less than half of the installations.

Nearly half the hardware monitor users made no estimate of improvement realized by these tools. Howard wasn't surprised, noting that the reason may simply be the difficulty of assessing the improvement, compared with what they had before any changes – triggered by the monitoring – were made.

The software monitors used "varied all over the lot from homegrown to many of the standard commercial packages," Howard noted. Boole and Babbage's CUE and Supermon, from Cosmic, were most frequently reported, he added.

Job accounting was well thought of as a performance analysis tool and "ranks as the most likely to be used in the future," the survey went on. Accounting data is usually a byproduct of normal operations and there are numerous packages available to analyze the data thus collected.

Optimizers/analyzers were used by 37% of all respondents which was a surprisingly low figure, according to Howard, in light of the number of "good packages on the market with price tags that are quite reasonable." Boole and Babbage's PPE was used most, though Capex's Optimizer and Cotune, as well as Cosmic's Proglook were named by "respectable numbers."



CPE is generally handled as a series of special projects, rather than as an ongoing formal program, and the work tends to be done by systems programmers, 147 respondents told *EDP/PR*.

Personnel Assigned	Formal Program		No Formal Program	
	FT	PT	FT	PT
1	9	9	1	39
2	6	9	1	21
3	2	9		5
4	2	3		4
>4	4	2		1

Most people assigned to CPE work on a part-time basis, the survey found. Full-timers were used, with two exceptions, only when an installation had a formal program.

Drop Off in Benchmarks

Benchmarks will drop off in use in the future, the survey indicated, probably because the growing complexity of systems and the gradual trend toward teleprocessing is making creation of meaningful benchmarks and their interpretation more difficult, Howard said.

Simulation was used by less than 20% of the users and nearly half of them are using the generalized simulation system (GPSS) rather than a simulator tailored specifically to DP interests.

The survey results were summarized in the March issue of *EDP/PR*, which is available for an annual subscription of $36. Single copy prices are $3 for subscribers, $5 for non-subscribers, Howard noted.

EDP/PR is published by Applied Computer Research at Suite 298, 8808 N. Central Ave., 85020.

'Executor' Speeds OS/Hasp Jobs, May Reduce Throughput Time 30%

DALLAS – OS/360-370 users running under Hasp may experience overall throughput improvements of more than 30% by using the Executor job management processor from Cutler-Williams, Inc. (Cutwil) concurrently with the MVT Initiator or MFT Scheduler.

Benchmarks run at user sites with user workloads appear to substantiate the possibility of that degree of savings. The vendor is quick to note, however, the actual saving at any given installation depends in part on the mix of jobs to be processed.

Executor differs from IBM's control software in two specific areas. First, IBM goes out and builds up the initiator for every single step, at step time; Executor does it once, building the entire JCL stream and related data at job time.

Between steps of a job, the IBM approach may require as many as 29 I/O seeks to get all required information, according to one user's estimate; Executor uses one seek to accomplish the same thing.

Temporary Hold

The other savings made possible with Executor occurs when a job is to be initiated. If all the resources needed are not available, Executor puts the job in a temporary hold and brings in another job for which enough resources may be available.

Under normal OS operations, once a job gets the initiator, "it sits and ties up core or whatever resources are available until it can get all the resources it needs to run," the user added.

The overall effect of using Executor in his service bureau environment, the source said, is that the long list of jobs awaiting execution has dwindled, but it has been replaced in part by a list of jobs waiting for printer facilities.

JCL scanning under Executor takes two to four seconds. If the system encounters a job it cannot process, it returns the job to Hasp so it may be run by an OS initiator.

Executor is completely transparent to the application program, but does generate a new set of control messages for the console operator.

Under MVT, the Executor requires a dedicated region of 16K plus 1K bytes for each concurrent Executor, and a 6K module in the Link-Pack area.

Executor is available under rental, lease or purchase agreements. The lease plan costs $350/week per CPU and a perpetual license can be acquired for $20,000, including 24 months of maintenance.

Cutler-Williams is at 2655 Villa Creek Drive, 75234.

Interdata 7/32 Gets OS Upgrade

OCEANPORT, N.J. – By the end of this year, users of Interdata's Model 7/32 will be able to install OS/32-MT, a real-time multitasking operating system

Along with OS/32-MT, Interdata has now introduced a new operating system for its conventional minis, and "Stretch 32," a pair of printed circuit boards that can be retrofitted to Model 7/16 minis to convert them to 7/32s.

OS/32-MT includes a Command Processor that allows the user to trigger a sequence of system commands with one macro-level instruction, and a management system for three different file structures. The system supports Fortran V, a real-time superset of industry-standard Fortran; single- and multi-user Basic; and an assembly language along with editing utilities.

Common Assembly Language (CAL) is unique. It generates object code in either 16-bit or 32-bit format using any of Interdata's processors as a source machine, and permits tasks written under the company's 16-bit operating system to run, after reassembly, without modification, under OS/32-MT.

Users have a choice of chained, indexed or contiguous file structures under OS/32-MT's file management module. Chained files, the company suggested, are ideal for heavy sequential usage which can be changed, if desired, to random access during the course of a program run.

An indexed structure is provided for applications in which fast random access is required, and contiguous files support those runs that require direct physical I/O of variable-length records.

OS/32-MT will be available in the fourth quarter for $3,000 or $3,300 depending on recording media.

The new OS/16 will provide the Model 7/16 user with facilities comparable to those of OS/32-ST, the serial-tasking system for the 32-bit machines.

The Stretch 32 hardware is scheduled for availability this summer and will cost $5,000, an Interdata spokesman said from 2 Crescent Place, 07757.

BCS Aids Carpoolers

DOVER, N.J. – Even companies with little in-house DP equipment can use the software behind Boeing's giant carpool [CW, April 10], with Carpool I now on Boeing Computer Services' network. This system matches workers with the same start points and destinations, BCS said.

Carpool II, also on BCS, allows several pickup points and several destinations for individual car pools. Based here, BCS provides access to its systems from users' terminals in most major U.S. cities.

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'Total' Gets Own Report Writer; DBMS Also Adapted to NCR CPUs

CINCINNATI – Users of the Total data base management system can produce reports faster, through direct use of the system's internal logic, with a generalized extract and report subsystem known as Socrates, now available from Cincom Systems, Inc.

At the same time, a special version of Total written in Neat/3 is being made available to users of NCR's Century 251 and 300 computers, from either Cincom or NCR.

Socrates, which runs only on IBM 360/370 and Univac Series 70 equipment, supports a procedure language "consistent with Cobol" for specialized program logic, along with predetermined logic somewhat akin to RPG for the input and output editing and formatting functions.

More Than Interfaced

Though it does much the same as the various independent report writer packages that have been interfaced with Total, Socrates works directly with the internal logic of the system rather than meeting its input requirements externally.

Since Socrates accesses Total's data base definition phase, for example, there is no need for a precompile pass to change the report writer's output into a form acceptable to the data base management system.

Likewise, since Total has no limits on the number of files that can be processed or the number of relationships that can be defined, neither does Socrates, the Cincom spokesman noted.

The initial version of Socrates runs in about 30K and handles Total and sequential files only, he said.

Socrates is priced separately from Total and costs $22,500 for IBM OS, or $20,750 for IBM or Univac Series 70 DOS users.

The NCR version of Total provides Century users with the same general approach to integrated data base management that the IBM, Univac and Honeywell versions support. Socrates, however, is not now available for the NCR users, Cincom pointed out.

The NCR version can be installed for a one-time cost of $30,000, including installation, training and support from Cincom, which is at 2181 Victory Parkway, 45206.

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Release dates are:
- OS and OS/VS versions — 2nd quarter '74.
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How come another SyncSort package?

Public demand. When users saw how good SyncSort I and II were, they asked for a new version with wider applications.

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With SyncSort III you are assured of good performance in any environment and retain the benefits of our still very valid SyncSort II:
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In addition, all SyncSort packages are scheduled to provide the following features:
- Support for all tape and random access devices.
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- Checkpoint—Restart
- Re-enterant code.
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Check out SyncSort III or the accelerated SyncSort II today.

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Whitlow Computer Systems, Inc.

222 S. Marginal Rd., Fort Lee, New Jersey 07024

Edos Add-On Backs Better Disk Usage

RICHMOND, Va. – IBM 360 users operating under even the basic version of Edos can have disk support capabilities previously only in OS/360-370, with the Disk Space Management (DSM) enhancement package, available from the Edos vendor, The Computer Software Co. (TCSC).

DSM dynamically allocates file space from any available area on a disk volume. The user, therefore, is relieved from manually mapping disk volumes to determine what areas are available for new files.

While the DSM user can specify the maximum number of tracks that might be used by a sequential output file, DSM will automatically truncate the file to the area actually used, as soon as the file is closed. The unused tracks are released from that assignment and become available for use by other files.

DSM can delete input files when they are closed, and delete or retain any file by file name.

The space allocation algorithm within DSM minimizes seek times by placing files as close together as possible, a TCSC source noted.

Unique Files

DSM is partition-independent and can maintain file uniqueness even if two or more partitions – Edos may, with an optional enhancement, support as many as six – open the same file name at the same time on the same disk volume.

DSM is available to Edos users for a monthly lease price of $100. The basic Edos, which is all that is needed to support DSM, costs $260/mo on rental, or $225/mo on a yearly lease plan.

TCSC is at 11 N. Sixth St., 23219.

Webster Source Librarians Now Available From NCI

ATLANTA – IBM 360/370 users can now acquire the source data library maintenance systems, Splis II (for DOS) or Prolib (for OS) – originally developed and marketed by Webster Computing Corp., Danbury, Conn. – from NCI, Inc.

The systems provide storage, maintenance and retrieval of source programs, JCL, object modules, text or any other card image data on disk or tape. Each package can be purchased for $1,500, from 6075 Roswell Road, 30328.

Cobol Clinic

Compression Saves I/O Transfers, Peripheral Space

By Bob Brown
Special to Computerworld

Often programmers and system designers think of file compression techniques only when working with very large files (several million records). Yet a savings of 10 byte/record results in a reduction of 1M byte in a 100,000 record file. More importantly, many of the techniques which reduce the size of a record will also improve processing speeds. A smaller record requires less transfer time to or from main storage. By reducing logical record size, the blocking factor may be increased, reducing the total number of physical I/O operations for a sequential file. Finally, techniques which tend to reduce record size may also lead to better code in the processing programs.

A word of warning is in order, though. Most of the techniques described here take advantage of hardware design. This article was written with System 360-like mainframes (byte-oriented rather than word-oriented) in mind. Programs using these techniques will usually run on mainframes of different design, but may not give the efficiencies desired.

Know Your Data

The most obvious way to reduce the size of a record is to know your data and not reserve more space than is needed for any given field. If, for example, a numeric quantity can never be more than 50,000, one should reserve only a five-digit field for it. (It's amazing how often this isn't done.) The name on any city in the U.S. can be spelled out or "officially" abbreviated in 13 characters. Similarly there are "official" two-letter abbreviations for the states. Allow five digits for Zip Code, and 20 bytes are sufficient for the city-and-state portion of a domestic address.

Use Internal Formats

Numeric data will occupy less space if represented in internal (machine) format rather than external (character) format. An added benefit is that the compiler will not have to generate instructions to convert to internal format before processing.

Packed decimal (COMP-3) format is a good compromise between binary and character formats. It may be processed directly on most 360-like mainframes, it is easy to decode in file dumps, and it avoids alignment problems. (Hint: always specify an odd number of digits in the PICTURE clause of a COMP-3 item. Space will be reserved for that extra digit anyway, and if the PICTURE size is even, extra instructions will be generated to mask off the high-order digit.)

Any number in the range 0-255 may be stored in a single byte using the following code. In working storage, set up this structure:

```
01 SMALL-NUMBER PIC 999 COMP SYNC.
01 BYTES REDEFINES SMALL-NUMBER.
   02 FILLER PIC X.
   02 RIGHT-HALF PIC X.
```

If SMALL-NUMBER is less than 256 and unsigned, it will be represented entirely within the byte defined by RIGHT-HALF, which may then be moved to a file area. To get the number back to COMPUTATIONAL form, move ZERO to SMALL-NUMBER and the stored byte to RIGHT-HALF.

A similar structure may be used to store a two-digit decimal number (without sign) in a single byte:

```
01 DEC-NUMBER PIC S99V9 COMP-3.
01 DEC-BYTES REDEFINES DEC-NUMBER.
   02 LEFT-HALF PIC X.
   02 FILLER PIC X.
```

In this case, the two digits will be in LEFT-HALF; the right half will contain a zero (the fractional portion) and the sign, which will be discarded.

A limited amount of bit-manipulation is also possible in Cobol, permitting up to eight "on/off" switches to be stored in a single byte. It is first necessary to place the byte to be operated on in the low-order portion of a COMPUTATIONAL data item as explained above.

Consider the bits to be numbered from zero to seven beginning with the rightmost (low-order) bit. To set a bit from zero to one, simply add 2^n where n is the number of the bit. For example, to set bit 3 (the fourth bit from the right) add $2^3 = 8$. To set zero add $2^0 = 1$. (Warning: This will only work if the bit was previously zero.) Similarly, to change a bit from one to zero, subtract the appropriate power of 2.

The Cobol Clinic is intended to serve as a clearinghouse of ideas to make user programs more efficient. Reactions to Brown's proposals are welcome, as are descriptions of other areas readers have found to be critical to their own coding effectiveness. Reports of optimizing efforts would be of interest.

Bits may be tested by dividing by 2^n, then dividing the result by 2. The remainder following this second division will be zero or one depending upon the bit setting.

When considering whether to use this technique, remember that division is a time-consuming operation. Be careful not to lose information by storing the results of the division on top of the data being tested.

Use Numeric Representations

Representing information in the form of numeric codes usually leads to both reduced file space requirements and faster processing. To revert to a previous example, the name of a state or Canadian province could be coded in a single byte by assigning each name a numeric code and storing the code using the techniques already described.

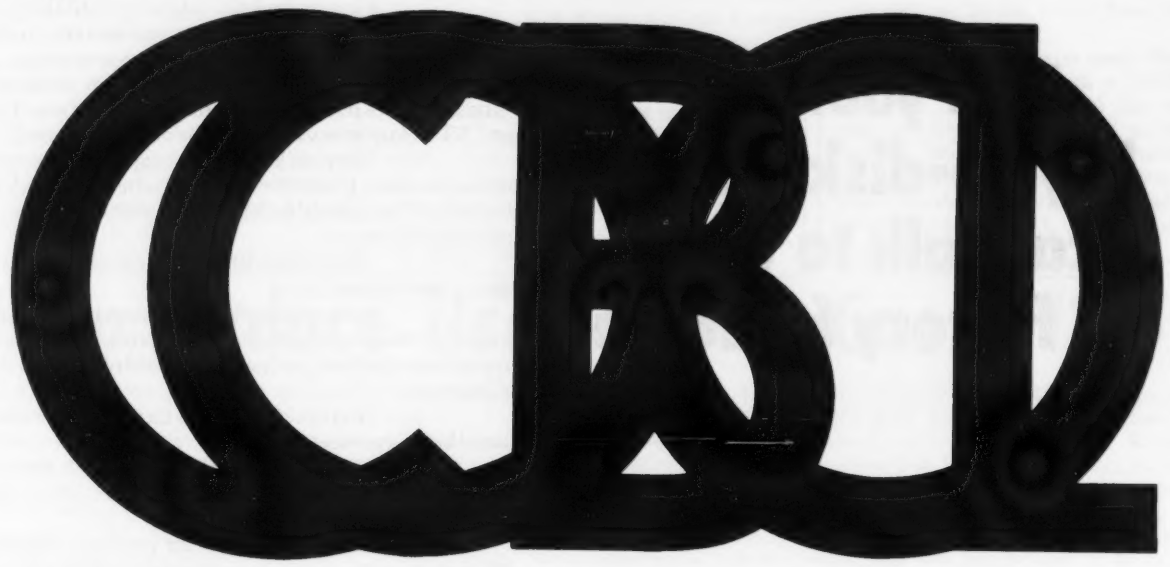
This does not mean that users should have to remember (or even know about) these codes, either for input preparation or for reading output. An input edit program should convert from a mnemonic representation to the code. On output the code may be used as a subscript to extract the mnemonic from a table. (For ease of maintenance, such a table should reside in the source statement library and be called with a COPY verb.)

Bob Brown is a programmer analyst with the City of Atlanta, Division of Systems and Programming.

ASP Classes Available

WETHERSFIELD, Conn. – Courses dealing with both the internals and externals of IBM's Asymmetric Multiprocessing System (ASP) are offered at user sites, by Rolfe Associates, Inc.

The courses are planned around the users' established procedures, the firm noted from 185 Silas Deane Hwy., 06109.



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'Xmas' Controls Manufacturer Accounting

ARLINGTON, Va. – Manufacturers using 360 or 370 mainframes can gain a Santa Claus bag-sized collection of application programs in financial planning, production control and administrative and financial support functions, with the Managerial Accounting System (Xmas) package from Xonics, Inc.

There are 26 modules in Xmas, including direct order purchasing control, inventory control, sales support, and budget preparation and control. Other areas covered include multidivisional financial reporting, plan production reporting, payroll, medical and safety recordkeeping.

The DP department itself can be controlled by Xmas. Subsystem 68, for example, collects and reports time spent on various projects by the systems and programming staffs. It also handles estimates of time to be spent on upcoming projects.

Another segment of this same subsystem focuses on utilization of the computer and related equipment costs. It allows distribution of computer center resource utilization by system use and priority and provides a method by which deficiencies in the operation can be identified and – hopefully – corrected.

The subsystem linked to manufacturing production control was written for metal reduction shops but the functions included in these modules are, according to Xonics, both process- and job-oriented and the requirements of other industries could be met by fairly simple tailoring.

Though originally designed for batch processing (under either DOS or OS), Xmas modules may be run in an interactive mode using IBM 2260, or compatible, video display stations. This option makes the information even more immediately valuable to the working manager, Xonics noted.

While the various modules can be used in stand-alone mode, they have been designed to work together to create a fully integrated information system. The largest module requires no more than a 24K partition in main storage and two spindles of disk.

Written in PL/I, the modules can be purchased or leased. Purchase prices range from $2,000 to $12,000.

Xonics Data Systems Division is at 1701 N. Fort Myer Drive, 22209.

Now your key-to-disk system can talk to your factory foreman.

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They can locate a job, logged that day, on the production floor. Check if it's on or off schedule. Check that day's scrap. Parts available. Manpower available. Or any other current record.

The factory data on disk can be dumped to tape or reformatted, too.

So the data collection system becomes more powerful. When used with the central processor, it gives management current analysis and control of the daily flow of business.

And now it also gives factory supervision a useful bird's-eye view.

Your key-to-disk becomes worth more than ever. Especially with the 2400's alternate concurrent options, RJE communications and printing.

That's an awful lot for your buck. For the full story in terms of your own operation, call your nearby MDS office, or our headquarters at (315) 792-2424. Mohawk Data Sciences Corp., Utica, N.Y. 13503.

System Eyes Fund Floats

COLUMBIA, Md. – Banks with IBM 360/370s can provide client corporate management with reports of fund distribution for an account over a period of up to 20 days, with the Customer Float Reporting Service (CFRS) from the Disc Division of Hittman Associates, Inc.

The service shows the paid checks from date of issue to date paid summarized by the number of items and dollar amounts. In addition, CRFS shows a comparison by percentages to the total account for the selected time period.

The report period can correspond to the normal statement cycle of the bank or the data can be combined and analyzed for any period up to a year. This historical data lets the client analyze and estimate his cash requirements in order to better distribute his cash resources, Disc explained.

Account distribution can be provided with as many as three levels of totals, selectively by account, as well as summarizing totals for the entire account.

Magnetic Tape

CFRS can also generate a tape output at the selected minor total level which the bank can then use for further analysis applicable to the individual client's needs. It could, presumably, be given directly to the client for use on his own in-house CPU.

CFRS can be used as a module within Disc's Account Reconciliation System or as an independent system. In self-standing mode, it utilizes data provided by bank clients in any format, which an edit run then reformats to fit the system.

CFRS can run in a 64K DOS partition with both tape and disk. The OS implementation requires a maximum of 100K bytes of main storage for efficient operation, the company said.

The DOS version is available for $3,500, while the OS packaging costs $6,000, from 9190 Red Branch Road, 21045.

DTSS Has a Real 'Find'

HANOVER, N.H. – An information retrieval/planning program developed for a special purpose but then generalized, Find (Forecasting Institutional Needs at Dartmouth) is available on the Dartmouth Time-Sharing System, and in the packaging of the system offered by DTSS, Inc., P.O. Box 799, 03755.

Geographic Limits

Private-Line Users Can Consider DDS

By Ronald A. Frank
Of the CW Staff

NEW YORK – Now that AT&T has unveiled its proposed rates for the Digital Dataphone Service (DDS), users will have a new service to factor into their private-line requirements.

With the advent of the Bell digital service, data users in urban areas in many cases will be able to choose between Existing Bell private lines (Tariff 260), the offerings of the specialized carriers and now DDS.

The rate structure for DDS is complicated like so many phone tariffs [CW, March 27], but from the information filed with the Federal Communications Commission it is clear the five-city digital service will be geographically limited.

Although AT&T said Type 2 local access lines would ultimately be available up to 50 miles from DDS hub (central) offices, the first exchanges where service will be available are relatively close to the urban centers. The farthest mileage from a DDS hub in the proposed tariff is 26 miles from New York City into Westchester County. In other cities in the initial net the distance from the hub where Type 2 loops are available is typically 10 to 15 miles.

AT&T has said these distances will be expanded as its T-carrier digital facilities are available in more areas. Meanwhile, users not within the Type 2 mileage limits will have to rely on existing private lines. There will be an addition to the DDS offerings "early in 1975" that will allow

Analysis

the interconnection of analog local loops with DDS facilities, Bell said. When this is implemented, users will have lines that combine both analog and digital facilities.

But one of the main reasons for introducing the digital service has been the increased reliability. The addition of an analog link would presumably degrade the reliability and will also require the user to combine a data set with a Data Service Unit (DSU). The data set would be necessary to transmit over the analog portion of the line while the DSU would be required to convert the signal for compatibility with DDS.

Correcting an earlier statement, AT&T said there will be a charge for the DSU. At 2,400-, 4,800- and 9,600 bit/sec, the DSU will cost $15/mo and at 56 kbit/sec the charge will be $20/mo. In addition, the DDS user will have to pay $25 for installation of the unit.

The DSU will provide coding and decoding of the bipolar DDS signals, timing recovery, synchronous sampling, formatting, and it will generate and recognize control signals. It will provide the user with an EIA RS 232 interface to the DDS facility. For users who want to provide their own data signal processing, a Channel Service Unit will be available as part of the access line, without a separate monthly cost.

Multi-station configurations are allowed with DDS and a monthly charge of $15/mo per station is made. Each station will be connected to the facilities by a digital access line. Users will be able to share DDS facilities but one primary user will be responsible for billing and interfacing with the local phone company.

Datran Asks Delay

While the FCC is considering the DDS application, now scheduled to take effect on May 18, 1974, Datran has sent a letter to FCC Chairman Robert Wiley requesting a four-month delay to evaluate the AT&T proposal. Stating that the AT&T filing includes 2,300 pages including "extensive computer programs and printouts," Datran said: "It is totally unrealistic to . . . evaluate the reported data and formulate meaningful and responsible conclusions . . . in the 24 days allowed for public comment."

Bell CRT N.Y. Rates Have New Rent Plan

ALBANY, N.Y. – Proposed Bell System intrastate rates for the Dataspeed 40 display terminal will offer New York users two rental payment plans. This marks the first time users will have a choice of payment methods on Bell data equipment, according to an AT&T spokesman.

The rates were filed by New York Telephone Co. with the New York Public Service Commission to take effect on May 1, 1974, if approved by the commission.

The Dataspeed 40 terminal would cost users $120/mo with a $150 installation charge under the usual rentals, called Plan 1. The new rates, called Plan 2, would require the user to pay $300.50/mo for the first year and $96/mo thereafter. The keyboard/display unit with printer costs $180/mo with $150 installation under Plan 1, while under Plan 2 the first-year rate would be $444.50/mo with $144/mo thereafter.

The receive-only printer under Plan 1 would cost $105/mo with a $150 installation, or under Plan 2 the first-year rate would cost $264.50/mo with $84/mo thereafter. The minimum charge regardless of the plan selected would be the monthly charge and installation under Plan 1 for a period of 12 months.

Multiplexers Help Reduce User's Line Costs 12.5%

By Patrick Ward
Of the CW Staff

SAN FRANCISCO – By using multiplexers to combine data streams going to remote terminals, VWR Scientific, Inc. here expects to cut its line costs by 12.5% and improve CRT response time.

VWR, a distributor of scientific apparatus, laboratory chemicals and biomedicals, has 68 IBM 3270 terminals in 18 sales offices across the country. Four of the largest sales offices also use IBM 3780 RJE terminals, said R.L. Wallquist, operations manager.

The CRTs are used for sales data entry to a centralized file here, and for five different types of on-line inquiries against a data base, Wallquist said.

Of these, the most often used is an inventory inquiry application that accesses approximately 45,000 records on stock in four warehouse sites, Wallquist noted.

The customer order inquiry accesses a 150,000-record file of present customer orders; a customer name and address inquiry goes to 50,000 more records; and a back order inquiry reaches about 15,000 records. VWR's own purchase orders with vendors are in a 20,000-record file.

Data entered from the remote 3270s is stored on disk and processed five times a day on a 256K IBM 360/40 at the central site. About 12,000 to 13,000 inquiries are handled daily.

Three leased lines, one going north, one going east and one going south from San Francisco serve the CRT network by polling a number of drops, said Lester Gray, vice-president for management information and computer services. Transmission is at 2,400 bit/sec, he added.

The 3270s are polled from the CPU's foreground partition using Cincom's Environ/1 package, Wallquist stated.

Four more lines, unconnected to the CRT net, handle the four RJE terminals, which transmit at 4,800 bit/sec, Wallquist noted.

The 14,000 miles of leased lines for the two separate nets cost $16,000/mo, Wallquist said.

Two problems with the system caused VWR to call in a communications consultant, he continued.

One problem was apparent, Wallquist said, simply by "looking at a map of the U.S. and seeing that those lines ran parallel to one another over long distances."

Also, inquiry response time on the CRTs was "not too good," on the heavily used line going east to Rochester, N.Y. It was up to 11 seconds at peak periods, he said.

Response times were unpredictable because of the peak periods, and the number of drops and bridges in the net, Gray added.

The consultant's job, Wallquist said, was to solve response time and cost problems and to point the company in a direction where it eventually could use minis as remote concentrators.

Following the consultant's recommendations, VWR's phase one plans are to multiplex one leased line going to the RJE sites to carry both RJE and CRT data streams.

The company plans to use ICC time division multiplexers (TDM) and run a single line at 7,200 bit/sec.

At Rochester, for example, "we will split out the two streams," Wallquist explained, "and run our remote job entry the same way we are now, at 4,800 bit/sec, and we will put another data set there to multidrop the lines on the East Coast . . . at 2,400 bit/sec."

VWR plans to install its first TDM set between San Francisco and Seattle this month.

"It's a rather close office and fairly simple to do in a test mode, and if that works we'll institute phase one as soon as possible because it is fairly transparent to both the hardware and software," Wallquist commented.

Once the lines are multiplexed, net savings will be about $2,000/mo.

By using the four RJE lines to carry CRT data, VWR will now have two lines serving the eastern CRTs, Wallquist pointed out, and this will lower the worst response times from 11 to seven seconds. However, he added, the company had used one of the lines for voice transmission, and will not be able to do so with multiplexing.

Phase two would involve reversing the CRT and RJE bit rates, so that the RJEs, perhaps using data compression techniques, could transmit their daily workload at 2,400 bit/sec. CRTs would then transmit at 4,800 bit/sec, reducing response times further, he said.

However, phase two would tend to increase costs by about $1,300/mo, "simply because we would have more data sets of a higher speed," Wallquist observed. But he added that programming costs would be low.

Phase three would likely involve use of a mini front end taking some load from the CPU and use of minis at the major remote offices as concentrators for CRTs.

Phase three is simply the direction the company is moving in, and not yet a definite goal, Wallquist emphasized. But both he and Gray expressed satisfaction that the network changes for phase one will "fit in very neatly" with a phase three whenever it is implemented.

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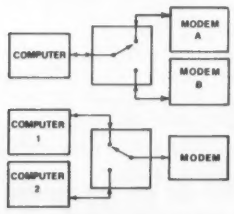

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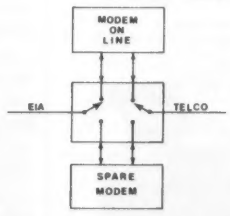

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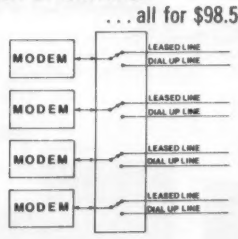

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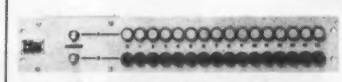

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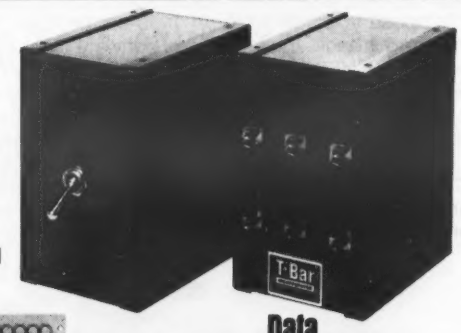

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Telenet Expects to Be Operating in 18 Cities in '75

DALLAS – Telenet Communications Corp. by the end of next year will be operating switching centers in 18 cities, and these will be interconnected by 50 kbit/sec (and 56 kbit/sec) terrestrial channels leased from the transmission carriers, such as AT&T. The firm will also lease a 1.5 M bit/sec satellite channel from one of the domestic satellite carriers, according to Telenet President Dr. Lawrence Roberts.

Speaking at a technical session during the Interface 74 Conference, Roberts said subscriber terminals and computers will be connected to processors in the Telenet switching centers, using lines provided by the local telephone operating companies. For transmission efficiency, these switching computers then divide the subscribers' data into small segments, called packets, which are about 100 characters in size.

Each packet contains the address of its destination and is dynamically routed through several switching centers, along the path which is at that moment the most expeditious. In other words, a path between sender and receiver is *not* set up in advance. Also, since there are by design at least two paths between all node pairs, if a line or switch fails, or if a path becomes noisy or congested, packets are automatically routed via an alternate path.

To further ensure reliable delivery of the data, each packet contains a 24-bit error-detection code, which is checked and acknowledged over each leg in the path. If a packet is not acknowledged, it is retransmitted by the previous node.

Automatic alternate routing, and error detection and correction, are two of the "values" added by the packet-switching network.

The total time it takes to deliver a multipacket block of data through the network is only a fraction of a second. The processing delay in each switching computer is only a few hundred microseconds per packet, since the packets are stored in main memory rather than on peripheral devices; and the transmission delay over the lines is only 20 msec, since Telenet will use 50 kbit/sec channels.

A typical Telenet central office configuration will include IMPs (Interface Message Processors) which relay packets through the net, and TIPs (Terminal and Host Interface Processors) which link the subscriber's device, be it a terminal or a computer, to the network, in addition to relaying packets. If any of the switching processors or links in a central office fails, the traffic automatically bypasses the failure; if a TIP fails, the access lines are switched over to working units, Roberts said.

There will be three components to Telenet's charges. First, a packet or usage charge is based upon the number of packets – that is, the amount of information – which the user sends. The packet charge is independent of distance. The firm will price in this way because costs are "only a weak function of distance, and a flat packet charge is easier both for users to understand and for us to administer," he said.

The second component of the charge is for the use of access ports at central offices. There are dedicated ports for leased access lines, and dial-in ports.

Finally, there will be charges for the local access lines. These lines are leased by Telenet from the local telephone operating companies and charged back to the subscriber at cost. The costs of these local links will vary according to the relative locations of the Telenet central offices and the subscriber premises.

Telenet's charge will be between $1.50 and $2 per terminal-hour, Roberts predicted.

Display Terminal For Burroughs Units

ROCKVILLE, Md. – A Burroughs-compatible intelligent video display terminal, capable of interfacing with most Burroughs computer systems, is available from Ontel Corp.

The B 4000 has the following features of the 9252, 9253 and TD-800 Series video display terminals:

- Interfaces with modems or direct 2-wire connections.
- Communication procedures – poll and select with group select, fast select and contention polling and sequential select.
- Complete editing for inserting or deleting characters or lines.
- Block transmission switchable in steps from 110- to 9,600 baud.

Blinking Fields

In addition to the Burroughs-compatible features, the unit has an addressable/readable cursor, reverse fields, blinking fields and transparent mode (for debugging and monitoring).

Options include upper- and lower-case character sets, a graphics display, impact printer (ranging in speed from 100- to 300 char./sec), off-line storage of up to 300K char./cassette).

The B 4000 is priced at $3,470 (all options extra) with a 30-day delivery from 11400 Rockville Pike, 20852.

Teleprinter, Minicomputer Aid Patient Organ Profiles

HOUSTON – A teleprinter together with a 16K minicomputer have been coupled with blood analyzers to produce test results that previously required hours for doctors to obtain.

A GE Terminet 1200 teleprinter is used with a Computer Automated Industries mini in the Organ Profile System developed by Hycel, Inc.

The mini is preprogrammed with data on 10 different organ profiles selected after consultation with specialists in the fields of pathology, diagnostics and internal medicine. The system includes an operator panel with 10 function keys corresponding to the organ on which tests are to be run. By depressing one function key, the operator can compare patient tests with a series of parameters for a particular organ.

90 Seconds

The teleprinter can handle one patient or 17 individual tests every 90 seconds. Each blood level reading is compared with normal parameters stored in the processor and the results are printed out and interpreted on a special form produced on the teleprinter.

In addition to providing swift and accurate test results, the teleprinter can record date, patient number, room number, patient's name and physician's name for complete hospital files and medical history.

"The heart of the Organ Profile system," said a Hycel spokesman "is the report form which combines the teleprinter's digital printout accuracy with the simplicity of a graphic display.

The profile system is available as a turnkey capability for about $135,000.

The 1130 was a fine idea for its time. Time's up.

Introducing the Computer Hardware Inc. CHI-2130. A 16-bit, general purpose central processor with a basic cycle time of 800 nsec. Everything that the 1130 was, plus a heck of a lot more at three to six times faster. It also costs less.

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Bits & Pieces

Train Prints Both Sides Of Postcards in One Pass

EDISON, N.J. – For users printing postcards on both sides in two passes on the IBM 1404 printer, REOB Associates has an idea – a print train with mirror-image characters that will print the name and address through the card by means of a spot carbon sheet facing the back of the card. This allows users to print both sides in one pass.

Typical applications suitable for this technique are said to include utility billing, tax billing and other uses in which the message is personalized but not confidential. After printing, the spot carbon sheet is torn off and the postcards are ready to go.

The package consists of a Cobol subroutine and a specially built IBM 1403 or 3211 print train. About 26 mirror-image characters are added to the normal IBM print train by eliminating seldom-used graphics. REOB has applied for a patent on the idea, so IBM sells the train direct to REOB which in turn leases the train on a third-party basis to users. IBM will maintain the print train.

The program formats the address data from right to left and utilizes the mirror-image characters as required. The 1403 train is priced at $176/mo; the 3211 train at $576/mo, both including maintenance and over a three-year lease. The firm is at 73 Oliver Ave., 08817.

Speed Boosted on Gould Printer To 1,600 Line/Min Operation

NEWTON, Mass. – Gould Data Systems has increased the speed of its Model 5000 electrostatic printer/plotter from 1,200 line/min to 1,600 line/min when using a 64-character font. With a 96-character font the speed has been increased to 1,300 line/min. Using 11-inch-wide paper, the unit is priced at $7,600 from the firm at 20 Ossipee Road, 02164.

Clean Your Tapes Twice

WOODLAND HILLS, Calif. – The Dual Tape Cleaner, from Data Devices International, incorporates slotted, twin-rotating cleaning cylinders to contact the same area of tape on each pass.

The tape cleaner is priced at $2,995 from the firm at 6325 DeSoto Ave., 91364.

Diskette Said to Last 11M Rev

SUNNYVALE, Calif. – Information Terminals, Inc. has joined the growing list of vendors offering IBM-compatible floppy disks. The firm claims a media life of more than 11 million revolutions per track based on its own tests.

The diskettes cost $7.50 each in lots of 10 from the firm at 323 Soquel Way, 94086.

Plug-Compatible Devices For Non-IBM Users, Too

By Vic Farmer
Of the CW Staff

WATERTOWN, Mass. – Putting together a mixed-vendor system is getting easier every day, but for Keydata, a time-sharing and service bureau here, the task has not been a piece of cake.

Keydata uses twin Univac 494 CPUs, and plug-compatible peripherals for Univac equipment just don't fill up comparison charts in trade magazines.

So, Keydata has developed a simple philosophy in selecting its equipment – find out who's interested in making a plug-compatible peripheral and then test it.

Jonathan Huie of Keydata coordinates much of the testing and his philosophy is simple when it comes to testing equipment: "I feed data to the peripheral and I get data back."

In a recent test, for example, the firm switched from Univac 8c tapes to Storage Technology IBM 3420-type replacement units fitted with a minicomputer interface.

"The tape drives' function is to put data on the medium and read it back, so that's what we tested," Huie said.

"If we do get errors in a defective medium, the controller should tell you the problem when the data is being written. If the controller says it was able to write the data, it should be able to read it unless the tape is further damaged in handling," added Huie.

To test this ability on a tape drive, Keydata picked up a rejected roll of tape – "about five-years-old and beat to hell" – mounted it on the drive and proceeded to run a simple tape check test on the tape.

In this case, the test wrote out one block of data repeatedly to the end of the tape (EOT), but each block was identified with a block number.

"We go out to the EOT, turn around and read back. We do not attempt any retries at any point, and during the read-and-write passes we keep tables in core as to which blocks have write errors and which blocks have read errors. Then the two tables are compared," he said.

Idealistically, the error data should present a clear picture of the condition of the tape, but can also determine the drive's effectiveness, too.

In testing two manufacturers' tape units, Keydata found this test showed a block of data could be totally missed, a drive could indicate it correctly read data but the data was, in effect, scrambled, and under some conditions the size of the block mysteriously changed.

One positive permutation is to find a read-after-write error recorded on the write cycle but find the drive able to pick up the data on the final read cycle. This, in effect, indicates the controller works to a more critical standard on the read cycle to insure the data is adequately written. The real problem is when no errors are reported on the write cycle but the equipment fails to read the data on the read cycle.

Drum Emulation

Keydata also uses 26 Calcomp disk drives and five controllers operating in a modified Univac Fastrand drum emulation mode. The firm found the disk drives gave an improvement of two to one over the Fastrand system. Changes in the emulator scheme and operating system by Keydata allowed the disks to seek independently to boost the total improvement to a factor of three to one.

Keydata has over 750 terminals across the country that are run through 22 Honeywell 316 minicomputers acting as remote concentrators. So, in effect, the Univac 494 handles only 22 incoming data lines. Printing is run through a 360/50 and Data Products tape-to-print stations.

Keydata wanted to go to the higher-density 1,600 bit/in. tapes because of the update procedure it uses daily. Every night the firm dumps the contents of 22 disk packs to two tape copies which it uses to reformat and reload the disk. One of the two tapes is used in the updating and sorting of records and the other is backup. Reformatting of the disk is also redundant with two copies of each file made, and the second is saved until the next update the following night.

Keydata ends up with four copies of data every night.

This double copying of data both on disk and tape gives the firm a security blanket in case of equipment failure, Huie said, as the files can be recreated from the transaction log record tape.

Of the two 494 CPUs, one is used for program development and batch processing but can be substituted for the other in about 15 minutes.

3330-Type Drives Interfaced To Most Minis

EATONTOWN, N.J. – Minicomputer users with needs for massive amounts of on-line data now have the Diva, Inc. DD-30 and DD-32 116M byte/spindle disk systems to fill that need. The DD-32 is a twin-spindle version of the DD-30 which consists of one 3330-type drive and a controller with 4K buffer storage. Up to eight spindles can be driven from one controller. The units have 3330-type error detection and correction, electromagnetic actuator with optical transducer for accurate head positions. A dual-access interface option allows two controllers to access one bank of spindles to provide a common data base for dual-processor systems.

The transfer rates are buffer-controlled for timing and the controller is fully isolated from the direct memory access interface. One-slot interface cards are available for DEC PDP-11; Interdata 50, 70, 80, 7/16, 7/32; Data General Nova; Texas Instruments 960A and 980A; and the Digital Computer Controls 116.

System price for a single-drive DD-30 is $27,100; the DD-32 twin drive is $39,200 and delivery is slated within three months from the firm at 607 Industrial Way West, 07724.

Decus to Meet in May

MAYNARD, Mass. – The spring Symposium of the DEC Users Society will be held from May 29-31 at the Sheraton-Boston Hotel.

CDC Offers Floppy Diskettes

MINNEAPOLIS – Control Data Corp. has joined the growing group of vendors of IBM-compatible floppy diskettes priced at $7.50 apiece in a box of 10.

OCR Users Are Pleased: Datapro

DELRAN, N.J. – Users of optical readers are reasonably pleased with the performance and reliability of these devices, as shown by a user survey included in *All About Optical Readers*, a 40-page report available from Datapro Research Corp. for $10.

The survey combined the ratings assigned by 116 responding users to 125 optical character, mark and bar code readers.

While 85% of the respondents said they had a 5% or under rejection rate, 45% said they achieved a 2% or under rejection rate. OCR-A is still the predominant character font with 40% indicating they use it. In addition, twice as many users correct scanning errors off-line than on-line.

Datapro is at 1805 Underwood Blvd.

	Excellent	Good	Fair	Poor
Overall performance	26%	55%	16%	3%
Ease of operation	31%	52%	15%	2%
Freedom from recognition errors	19%	57%	21%	3%
Freedom from document jams	28%	33%	34%	5%
Equipment reliability	22%	48%	24%	6%
Maintenance service	23%	45%	28%	4%

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Iomec Card Reader Has 2,000-Hr MTBF

SANTA CLARA, Calif. – Iomec has released a series of card readers and a paper tape reader for minicomputer system use. The Series Five card reader combines a light-emitting diode read head with a friction pick mechanism and gives reading speeds from 300- to 600 card/min. The Series Five includes punched card and mark-sense readers in both table-top and rack-mount versions.

A special read station in the mark sense readers allows reading of punches and marks on the same card. The basic price of a 300 card/min reader is $1,575 and an interface for a DEC PDP-8e or PDP-11 is $765; a Data General Nova interface is $935.

Iomec claims an electrical Mean Time Between Failure (MTBF) of 21,000 hours and a mechanical MTBF of 2,000 hours for the readers. An RS232C interface is also available.

The 2032 photoelectric paper tape reader provides bidirectional tape reading in speeds up to 400 char./sec synchronously and step by step. The read head has no lenses and lamp adjustments have been eliminated, so the cartridge lamp can be changed by the equipment operator.

The 2032 is priced at $385, power supply at $160, and most minicomputer interfaces are slightly over $500. The firm is at 330 Scott Blvd., 95050.

Data Recorder Connects 3 Input Devices

OLD GREENWICH, Conn. – The Series 600 Data Recorder/Vari Punch from Varifab, Inc., is a small data recording system that consists of up to three input devices connected to a small card punch machine.

The unit will automatically punch input from a 10-switch digital array, a 10-column badge or card reader and a time clock at 12 column/sec. Output is on standard 80-column cards, and variable information can be added with a 10-key pad on the punch.

The desk top system is priced at $1,690 to $2,590 from the firm at 1700 E. Putnam Ave., 06870.

Transport Features Threshold Scanning

ALTADENA, Calif. – Two synchronous tape transports from Kennedy Co. incorporate an automatic scanning circuit which varies the threshold levels during read and backspace tape operations.

During normal read operation the threshold is selected for optimum data reliability.

When a read error is detected the circuit automatically shifts gain until the data can be recovered. Any error cycles the threshold, sequentially through four stages, minimizing lost data caused by drop-outs or drop-ins.

The 7- or 9-track 800/1,600 bit/in. drives also have an off-line crystal-controlled maintenance panel that exercises the drive. The two models, 9000-2 and 9000-3, offer NRZI, phase encoding or a combination of both options.

The drives are priced between $3,850 and $4,200 from the firm at 540 West Woodbury Road, 91001.

OEM Products

Mohawk Reader Allows Loading During Read

UTICA, N.Y. – The 6050 card reader from Mohawk Data Sciences Corp. allows loading of cards while the unit is operating in the normal reading mode.

The 300 card/min reader has a 1,000 card input hopper and a 1,100 card output hopper.

The 6050 reader is priced at $1,300 from the firm, which can be reached through Box 362, 13503.

Memorex Offers Printer

SANTA CLARA, Calif. – Memorex is now offering the 120 char./sec Ascii impact printer, incorporated in its data communications terminal as a separate unit.

The 1249 interfaces with both serial and parallel inputs and has dual paper path and adjustable tractor feed.

If Data Communications is part of your future, then this unique seminar should be on your schedule.

If you're now involved in Data Communications (or will be soon), we'll help you learn the ins and outs of the data communications field.

This is the seminar that wraps it all up for data communications users. It's called *Data Communications – The Executive Imperative*, and it covers both fundamentals and applications-oriented subjects ranging from transmission theory to terminal selection techniques. It gives you what you need to know to plan effective communications systems in two busy days. And that's saying quite a lot. Because data communications is a complicated area with many problems for the user. Proper planning is a must. And this seminar tells you how to go about it.

Some of the things you'll learn:

- Basic terminology of the field.
- Tariffs and cost-savings.
- Effect of transmission problems on a network.
- The modem – how it works and what it does.
- Terminals and their performance.
- Multiplexing and data concentration.
- Line-control software.
- Network organization and design.
- How to upgrade to a bigger system.

Free reference materials and continuing updates

As a participant in the Data Communications Seminar, you'll receive a valuable set of reference materials prepared by the ICC Institute. These materials include a comprehensive 2-volume looseleaf outline of all course materials, a copy of "Data Modem Selection and Evaluation Guide" by Vess V. Vilips, a "Data Communications and Teleprocessing Dictionary" and a line-cost calculator.

And that's just the beginning. You'll also receive free update materials for afull year! This is more than just a seminar. It's a continuing reference service as well.

Seminar Leader is Dr. Dixon Doll, a highly respected teleprocessing consultant

Dr. Dixon Doll leads the expert faculty at this seminar. He has his Ph.D. in Systems Engineering from the University of Michigan and many years of experience in this field as a consultant and educator. He has performed work-study with communications techniques at M.I.T., taught graduate-level computer systems design, and has served as professional consultant to such firms as IBM, Raytheon, ICC and MCI. Dr. Doll is in charge of our faculty of experts, and takes an active part in the entire seminar.

You should attend this seminar, if . . .

- You are currently involved in data communications on a management or operational level and wish to expand your knowledge of the field.
- Your company will be going into this field in the near future.

Charges and Enrollment

The total cost for this two-day seminar is $350, including workbook, reference materials, year-long update service, luncheons and continental breakfasts. This cost does not include hotel rooms, if necessary.

To enroll, look over the schedule below, fill out the coupon and send it in. Remember, enrollment must be limited, so don't wait until it's too late!

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Our new Flexydisks have been specially designed and formulated to provide trouble-free performance on 3740 and compatible equipment utilizing flexible disks.

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Tool Producer Finds Right Tools for More Production

By Raymond F. Reimnitz
Special to Computerworld

CHICAGO – Wen Products, Inc.'s production of its tool line increased 20% last year and is expected to grow another 50% this year.

A significant factor in supporting the accelerated production momentum is a small computer that assists both operations and management. The availability of reliable manufacturing information helps the company prevent production stoppages caused by any shortage of materials and parts. At the same time, it guards against excessive inventory buildups. The net result is more production at lower cost.

The computer, an IBM System/3 Model 10 with 24 K-byte main storage and 9.8M bytes of disk memory, is equipped with a 300 line/min printer and card reader/punch. A four-person staff includes a DP manager, programmer, and two keypunch operators, and the S/3/10 runs about 165 meter hours per month.

Integral to the computer processing is a multipurpose data base built around IBM's Bill of Materials Processor (Bomp). The bill processor makes it possible to relate hundreds of end products to thousands of component parts, and to explode through entire bill structures – level-by-level. This capability facilitates product costing and profitability determinations, and expedites requirements planning and replenishment purchasing. It is also helpful in controlling inventories and scheduling production.

Before the computer was installed it became increasingly difficult to determine the total materials requirements for a given production schedule release. It was also difficult to break down accurately material requirements by bill level, and to match the materials requirements with the materials availabilities at the work centers. As a result, frequent parts shortages and schedule interruptions occurred – and, sometimes, outright production stoppages.

The computer provided an effective means of coping with the problem.

No Delays

There no longer is difficulty or delay in determining materials requirements or availabilities. Manufacturing management simply develops a production plan for a given period, specifying the type and quantity of power tools to be produced. This is usually done weekly, but may be done as often as necessary to maintain sufficient finished product inventories so we can ship from stock to fill customer orders.

The computer explodes the production plan through all bill of material levels for each tool to be produced, and determines the materials requirements at each bill level. It extends the individual unit material requirements by the total number of units called for by the manufacturing plan. To accomplish this, the system uses a data base which consists of a set of three interrelated master files stored on disks.

A key reference file is the Item Master which stores a concise record for each of the 300 different products in the Wen tool line, and for some 3,500 items in the product bills. The record includes cost data, inventory stock status (on-hand, on-order, available) and a make or purchase part code. A 15-digit number identifies each finished part and end product. It is associated with all of its raw material and component requirements through an average of six, and through as many as 10 bills of material levels.

A Work Center File identifies each of the dozens of work centers at the two Wen Products plants in Chicago. It specifies what operations are performed at each work center for which parts, and provides labor hours and standards for the operations. A Routing File shows the work center paths through production for each part and product. It also lists the total requirements at each work center to meet a scheduled production release, as well as the current production load at each work center.

The Small Systems User

The effect of computer explosion of the bills and automatic netting of requirements is to produce a fully detailed schedule for production release, netting out what to make and where. The system then triggers a series of summary and expedite reports that are designed to assure that the corresponding materials will be available to meet the schedule requirements.

Production Report

A production shortage report, for example, is designed to identify parts and bill level requirements for the current production release. It pinpoints all material items that are not available in sufficient quantity. Similarly, a stock shortage report flags all stock items that might have slipped below a minimum inventory level, and may affect the completion of future production schedules unless corrective action is taken immediately.

To assist purchasing personnel in obtaining needed stock, a special expedite report indicates all supplier purchase orders that are overdue, and all purchase orders for which delivery is expected within the two weeks. The buyer uses this combined with a full stock status summary contrasting on-hand and on-order balances against production require-

(Continued on Page 25)

To enter data is human.
To ENTREX it, divine.

A Few Words About Optical Character Recognition

By R. Bhimjani
Special to Computerworld

Optical scanning as a general term includes optical mark, code or bar and character reading; however, optical scanning is only one of the functions of an optical reader. Scanning involves searching a form for marks, bar or characters, and conversion of the reflected optical impulses to electrical signals.

Recognition is the process of comparing these signals with matching sets of stored signals to determine their identity. Optical mark and code readers correlate the position and location of marks, bars or lines with predefined characters, while optical character readers identify each character by comparing its structure with features or characteristics stored in memory.

The keying of data is eliminated by the recognition abilities of the optical character reader which allows it to recognize data such as numeric handprinting, high-speed printing (by a computer), typewriting and preprinted material (on forms).

The Advantages

The optical reader provides the fastest means of data conversion and with the least potential to introduce errors, and at a lower cost per record (or form) than the traditional keypunch or other key-entry devices.

Optical character recognition (OCR) hardware:

- Feeds documents one at a time from input hopper and transports each document to the read stations.
- Scans and recognizes data.
- Performs edit and output formatting functions on the scanned data.
- Transports the documents into one of two stackers (accept or reject).

Paper handling is one of the major problems because the paper that OCR machines are expected to read can be handled or mishandled by humans, e.g. the paper has been bent, spindled, mutilated, stepped on, oil marked, stapled and crumpled. Because OCR machines are fast, handling such paper at very high speeds is extremely difficult.

While the paper-moving problem is gradually being solved, presently no machines can handle such documents without occasional, or perhaps frequent jams, and the quality of paper handlers can be categorized not by whether they have jams or not, but how easy it is to unjam the machine when a jam occurs. This is a case where training and cooperation of the users will pay great dividends.

Independent Functions

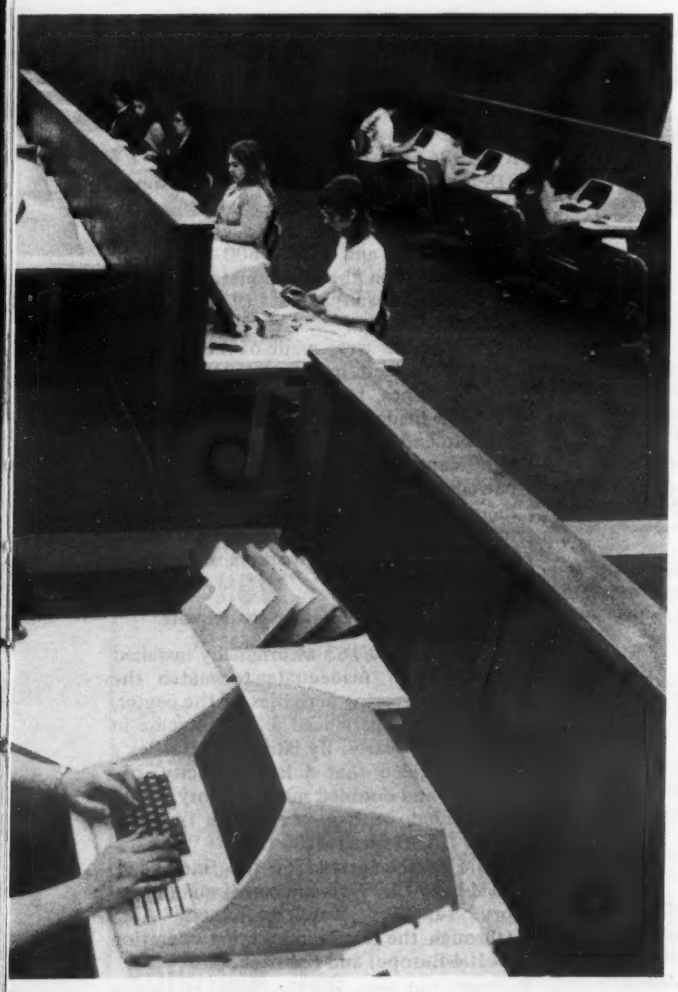
In OCR equipment evaluation most of the given specifications are self-explanatory, but reading speed in characters per second may not always be consistent with the document feed speed since these two functions can operate independently. For example, if a machine has strictly manual feed coupled with a very high reading speed, the throughput can be quite low when the operator is more than moderately fumble-fingered.

Also, the throughput, while limited by maximum document and character speeds, may be considerably below that indicated by the combination. The only way to determine throughput is by a test using the actual documents used by the application being tested.

The big difference is pre-processing in System 480's batch edit and output edit software – simultaneous with data entry.

No other key-to-disk system gives you so much control over the quality of your output, so much independence from the main frame, so much versatility in managing the data while you have it.

Files can be sorted, merged, and collated. Error message files can be created. Partial outputs can be examined. Virtually anything you could do in a tab room you can do on System 480, only much faster and much quieter.



As for data entry, both System 480 and our lower priced System 280 are unsurpassed in programmed helpfulness to the operator: Formatted, full record display; interactive English language messages; over 40 checks, flags, tables, and other software features (including our exclusive HELP button) for easy, error-free entry. Operators and supervisors love the ENTREX key station.

Highlights of System 480

Key stations	Up to 32 029 and typewriter
Display	480 characters
Disk	2.4M bytes or more
Tape unit	7 or 9 track, 556, 800, or 1600 bpi 10.5-in. 2400 ft.

Highlights of System 280

Key stations	Up to 12 029 or typewriter
Display	360 characters
Disk	1.8M bytes or more
Tape unit	9 track, 800 or 1600 bpi 8.5-in. 1200 ft.

While you're thinking about clean data, we suggest that you validate our batch of claims. A contact with somebody you know at one of the more than 200 ENTREX installations would be human. A call to one of our representatives would be divine. ENTREX, Inc., 168 Middlesex Turnpike, Burlington, Mass. 01803. (617) 273-0480. **ENTREX**

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Tool Maker Finds The Right Tools

(Continued from Page 24)

ments.

A weekly stock status report informs inventory managers of the current on-hand and on-order quantities, and the net availability of every item in inventory. It also provides a current inventory valuation, and a year-to-date issue total for each stock item. This key control report is supplemented with periodic summaries of total stock receipts by part and sales of raw parts for equipment repair purposes.

Clerical Work

In the meantime, the S/3 is also making important contributions to clercial, administrative and marketing efficiencies. In the office, the computer fully automates order writing, invoicing and accounts receivable. In administration, it generates cost and profit data, and has reduced overhead some 20%. In the marketing department, the computer explodes sales analyses by product units and dollars, customer and market area.

Raymond F. Reimnitz is controller for Wen Products, Inc. He joined the company in 1971 as company controller. At the time, the firm was using a computer service bureau for assistance with a growing inventory control problem.

'Incipient' Fire Found

MINNEAPOLIS – Developed especially for computer rooms, tape storage vaults and peripheral equipment areas, Honeywell's fire detection system uses detectors that "react to an incipient fire long before there's a wisp of smoke or hint of flame."

Instead of reacting to heat or light, these detectors spot a fire by the invisible products of combustion given off long before smoke or flame, according to the firm. Control modules available could automatically bring elevators, flash emergency instructions and monitor equipment in addition to summoning the fire department.

A typical installation is priced at $1,200 to $1,500 installed.

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Large 'Commercial' System Adapts to University Life

[The users are] "realizing the computer is no substitute for the quality of their thinking."

By John Joss
Special to Computerworld

CAMBRIDGE, England – When a rapidly expanding user base forced Cambridge University here to change from its scientifically oriented system to a large commercial environment, it acquired a new view of just what the computer could do in a university setting.

"We're seeing applications far beyond the 'obvious' scientific, mathematical and economic areas," said Dr. Brian Westwood, computer manager. "Biologists, social scientists, historians, English language specialists are all starting to appreciate what a powerful computer can do for them."

But more important, he added, "they're realizing the computer is no substitute for the quality of their thinking."

The Cambridge system is said to be one of the more ambitious computing services in Britain's educational system. It consists of a 1M-byte IBM 370/165, an IBM 2305-2 11M-byte disk and 1M bytes of semiconductor add-on memory from Advanced Memory Systems (AMS).

The system serves 1,800 academic users on- and off-line throughout about 50 university departments and at remote installations in other parts of the country, but handles no administrative tasks.

"Our greatest challenge," said Dr. David Hartley, director of the computing service, "is to meet the needs of our growing user population with a very large, complex hardware/software system that is far more 'commercial' than our previous setup.

"We simply can't make major – or minor – software changes as we used to. Since there is no charge to users," he explained, "controlling the work load and solving priority conflicts equitably remains an uncomfortable compromise that few of our 'customers' fully appreciate."

Humble Beginnings

Cambridge University was one of Britain's pioneer users. Its computing career began in 1949 with a homegrown, vacuum tube, experimental system for scientific work called Edsac (Electronic Delay Storage Automatic Computer). In 1955, Edsac was supplanted by Edsac/II, a nearly magnetic core system with 1K words of core, 16K being added on later, in what was basically a tape-oriented configuration.

In 1963, the Ferranti, later ICT, later ICL Atlas II, was brought in. It was used until late 1973 when the changeover to the 370 was complete.

Hartley ascribes the long and successful life of the Atlas II to effective systems software developed specifically for his machine. "We implemented about 1,000 systems software changes over a 500 working day period without losing as much as half a day's computing," he said.

But as effective as the Atlas II was, as early as 1967 it was apparent that it would have to be augmented and ultimately phased out as demand increased.

User Casebook

The university approached the Computer Board of the Department of Education and Science, a London-based government body that funds and approves educational computer installations. The school's description of long-term needs received a "buy British" suggestion of the ICL 1906A.

Despite an effective operating system, Cambridge's evaluation revealed that it was too small. The Burroughs B6700, Univac 1110 and CDC 6600 were also appraised, with the additional possibility of sharing capacity of a CDC 7600 destined for London.

Comparisons were made of the throughput/cost expectations from IBM 360 and 370 machines, but even the 360/65 and 75 rated inadequate to the ultimate task.

In the end, the nod went to the 370, in significant measure because of its compatibility with other, smaller 360 equipment at external universities, particularly in U.S. universities with which many Cambridge research workers have close contact.

Initial Configuration Inadequate

Even the 370/165 as originally installed soon proved inadequate to match the rapidly increasing activities of the center, which has experienced a 25% increase in work load yearly. By late 1972, Hartley's team decided that a large-capacity, on-line file and doubled main memory would be needed, with an expansion from six 3330 DASD files to 10.

IBM was selected for the fixed-head, 11M-byte file. Two additional main memory suppliers were evaluated – AMS (through the leasing/marketing operation of Itel-Europe) and Fabritek.

Itel's bid won on the basis of lowest cost and shortest (six-month) delivery for fully IBM-compatible performance.

Installation of the two memory increments was made over a weekend and was, according to Westwood, "smooth and

(Continued on Page 27)

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Commercial Unit Suits Scholars

(Continued from Page 26)

easy." The IBM upgrade of the CPU experienced a minor waterleak problem, but the entire reconfigured system ran successfully on the Sunday afternoon following work startup on the add-ons the day before.

Acceptance testing of both new memories, passed successfully by both in December 1973, included nine continuous hours of IBM diagnostics, with buffer enabled and disabled, followed by six hours of running large, simulated jobs under OS that fill virtually all the 2M bytes of main memory.

Operating Software

The operating system and other support software used, in contrast with the homegrown Atlas II, comes mainly from the system manufacturer, but some has been modified by the university. The 370/165 runs under OS with Hasp, supplemented for on-line work by Cambridge's Phoenix – a multiple-access system based on TSO but modified to suit the univeristy's special needs. Of the 100 remote terminals available, up to 34 may be on-line simultaneously devoted primarily to editing, filing and scheduling jobs for later batch processing.

Principal languages available include Fortran, PL/I, Algol, Cobol and Lisp, and packages include statistical, linear programming and CSMP. Utility routines are available in the locally written Camlib library.

With the constantly increasing demand, an even larger system configuration is anticipated by 1975-76. "Our activities are expanding rapidly and continuously – in quantity, quality and diversity," Westwood said. It's now the policy of the British Government to support universities in a goal of teaching programming to every university undergraduate, he noted.

"Beyond satisfying the immediate need to be a high-capacity, rapid-turnaround service for literally hundreds of users," Hartley summed up, "we want to go beyond our current time-sharing terminal use (editing, filing and job scheduling for batch processing) to deliver full interactive time-sharing service to selected users. We've never failed to meet our major goals and commitments in the past, and I believe we'll maintain that record in the future," he concluded.

What's Scarce in Supermarket?

OKLAHOMA CITY, Okla. – Data on food shortages has become so plentiful that food distributors here are using computers to tell retail grocers about price increases and item allocations.

Though designed to present a general picture of increases as well as shortages, printouts received by grocers are examined primarily for shortage information.

Allocation lists tell grocers to expect to receive only a limited number of cases of such scarce items as tomato juice, green beans or a particular brand of beets.

In an effort to distribute available supplies fairly among grocery stores, food distributors began compiling increase/shortage information about two months ago.

While computer lists make allocations more efficient, they don't explain why shortages exist.

Nevertheless, grocers tend to accept allocations without questions. "They come down and nobody says why," commented the owner of a large food store here. "Nobody gives any reasons why particular items are scarce either."

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Structured programming is a very precise, very rigorous, very *successful* form of modular programming. The related concept of *top-down design* is a rigorous and orderly approach to the design of a program or system in which the design, coding and testing of high-level modules (e.g., "main-line" coding) are completed before that of the lower-level modules in contrast to the classical "bottom-up" approach.

Dijkstra invented it in 1965. IBM popularized it with their New York Times project in 1971. *Datamation* made it legitimate with their cover story article in December 1973 – structured programming and top-down design have finally become officially recognized. Several programming projects have demonstrated that structured programming can dramatically reduce development and testing time: one project experienced an average of only one bug per 10,000 lines of coding; another project was successfully implemented with virtually no systems testing; several others have demonstrated a programmer productivity of 3 to 5 times higher than normal.

THE INSTRUCTOR

EDWARD YOURDON is lecturer, author and consultant in the areas of program design and on-line computer systems. He has presented over 150 seminars in structured programming, advanced programming techniques and real-time systems design in Europe, Canada, Australia and the U.S.A. His book, *Design of On-Line Computer Systems,* published by Prentice-Hall, is being used by numerous universities, and has been reviewed in Datamation (Dec. 1973) and *ACM Computing Reviews* (May 1973). He is currently completing another book entitled *Advanced Programming Techniques,* and has written a number of articles for *Datamation, Modern Data, Computers* and *Automation* and IEEE. Mr. Yourdon developed the PAL-III assembler for the PDP-8 at DEC, and has also held senior technical and management positions at General Electric and ELI Computer Time-Sharing. His practical experience with structured programming includes the design of a large payroll system for a major government agency in Australia, as well as a number of systems programming projects. Mr. Yourdon has A B.S. in mathematics from MIT, and has taught graduate-level courses at UCLA and RPI.

MAJOR TOPICS

1. **Introduction**
   Early work by Dijkstra and others; work by IBM; current developments.
2. **Theory of Structured Programming**
   The "black box" concept; Böhm and Jacopini building blocks: process boxes, IF-THEN-ELSE structures and DO-WHILE structures; reduction of programs to a single process box.
3. **Application to Common Programming Languages**
   The minimal set of programming statements; common extensions to the "pure" Bohm and Jacopini building blocks; structured programming in COBOL PL/I, FORTRAN and assembly language.
4. **Techniques of Structured Programming**
   Relationship to top-down design; duplication-of-coding technique; Ashcroft-Manna technique; Boolean flag technique; special programming situations – e.g., end-of-file processing, etc.
5. **Other Aspects of Structured Programming**
   Useful programming conventions to complement structured programming; practical considerations: is it worth the effort? is it inefficient? is it inconvenient? are current languages adequate?
6. **Top-Down Design Concepts**
   Top-down design: designing the major functional elements before proceeding to the more detailed elements; top-down coding: writing the code for each level of design before proceeding to the *design* of the next lower level; top-down testing: testing the higher functional levels of a program before the lower levels have even been designed.
7. **Case Studies Exercises and Related Topics**
   The IBM New York Times project; the concept of chief programmer teams; egoless programming; other recent case studies, examples and class problems.

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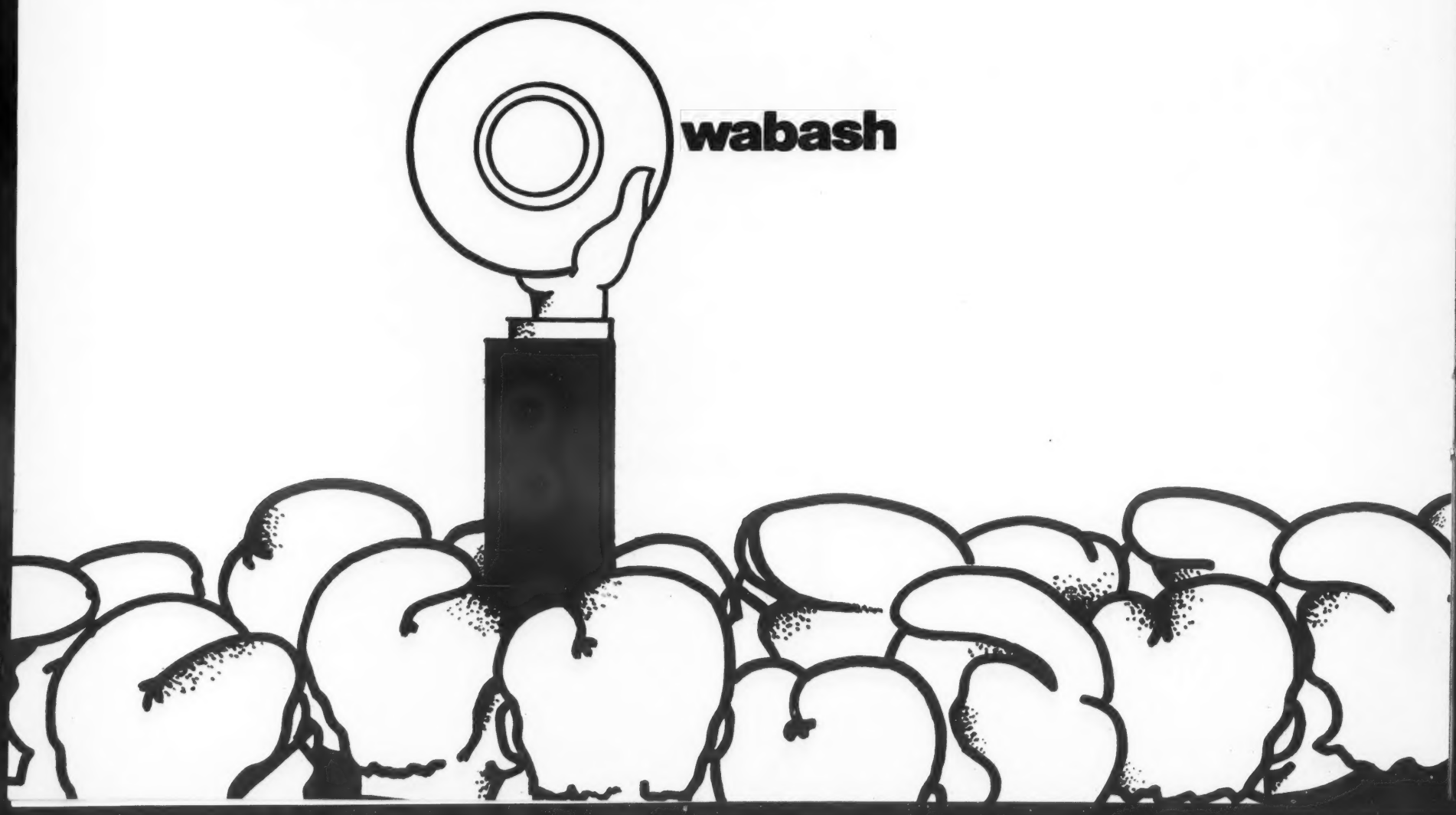
So go out in your waiting room and ask that question. Keep on asking it till one guy holds up his hand. Talk to him. He's our guy. The only one with something new to say.

For more information on Quadronix I Tape write Wabash Tape Corp., Huntley, Ill. 60142.



Air Traffic Control Modernized Further

WASHINGTON, D.C. – The first of 20 computer-driven radar display systems that will provide three-dimensional information on aircraft have been installed.

The installations at Kansas City and Los Angeles Air Route Traffic Control Centers represent more than 10 years of development and testing effort, the Federal Aviation Administration said.

Radar data processing is Phase Two of the FAA's center automation program and is scheduled to be fully implemented at all 20 locations by mid-1975. Phase One was the use of computers and associated equipment for the automatic processing and transfer of flight data and is fully operational at all 20 centers.

Phase Two involves direct readout of aircraft identity, altitude and other flight information on the controllers' radar scope. This information is presented in the form of electronically generated data tags which track with the related aircraft target return of "blip."

In the present system, controllers have only a two-dimensional (range and bearing) radar picture of aircraft position. The missing third dimension – altitude – must be obtained through voice communications. There also is no provision in the current system for electronically tagging and tracking individual targets. Controllers use small plastic markers – called "shrimp boats" – which must be pushed by hand across the horizontal radar scope as its associated target moves.

To implement Phase Two, three key elements are required – the radar digitizer, central computer complex and the display complex.

The radar digitizer is located at the long-range radar sites. It converts both the raw radar data and the signals from airborne transponders. These messages then are transmitted to the centers by land lines (telephone) or via microwave links.

When both phases of the enroute system are completed, they will be tied in with the automatic radar terminal system (Arts-III) located at more than 60 airports to provide an integrated system of air traffic control.

'We Tried'

SCHENECTADY, N.Y. – This city is apologizing to over 200 citizens who received computer-generated warning notices to pay parking tickets even after the tickets had already been paid.

A "software error" was blamed by city officials for sending out the redundant notices in recent weeks.

The city last year computerized its traffic ticket collection system which sends out warning letters to motorists who have not yet paid their tickets.

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Twenty Museums Plan Network To Share Data

STONY BROOK, N.Y. – Twenty museums, in the process of developing a computer network to access the information in their vast collections, are moving their headquarters from the Museum of Modern Art in New York to the State University here.

The network, a nonprofit organization, was formed to assist museums in the conversion of their inventories and extensive data files to a form that can be searched, sorted and analyzed electronically.

Included among the member institutions are the Arkansas Archeological Survey, the International Museum of Photography at George Eastman House in Rochester, N.Y., the Los Angeles Museum of Art, the National Gallery of Art in Washington, D.C., and the Metropolitan Museum of Art.

The network's data management system, Griphos (General Retrieval and Information Processor for Humanities-Oriented Studies), permits retrieval of dozens, or even hundreds, of cross-referenced characteristics of any given item. This compares with the fewer than six cross-references possible in the Library of Congress card cataloging currently used.

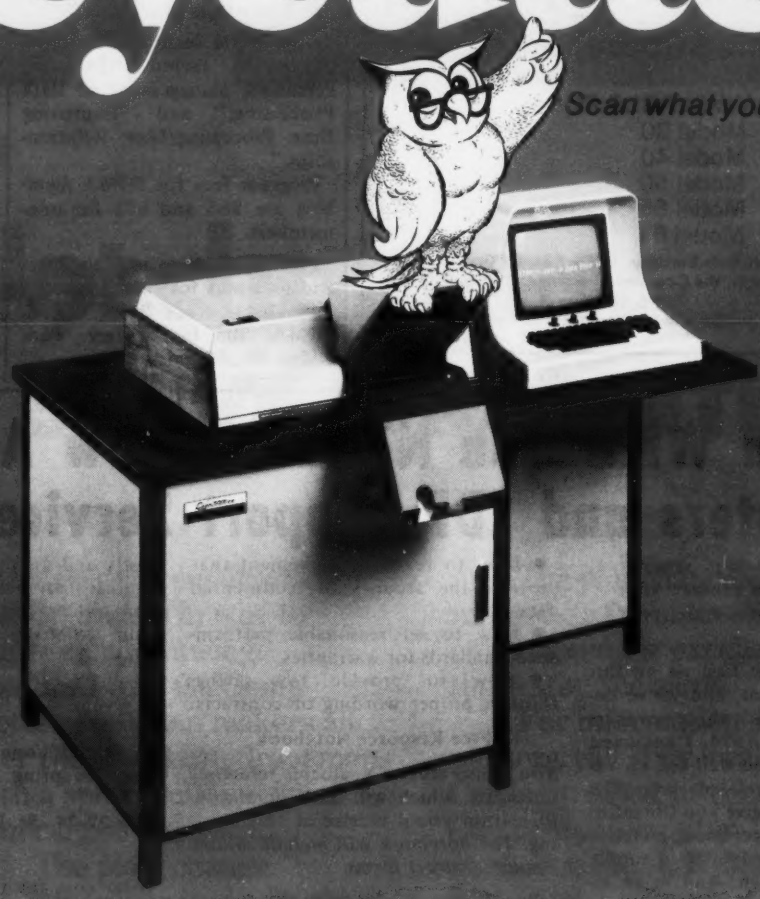
Graduate Programs

"The network's presence on campus," said university President John S. Toll, "will enable the university's computer sciences department to continue rapid development of badly needed graduate programs emphasizing the special skills required for computer applications in the humanities."

To date, the Museum of Modern Art's collections have been completely computerized; the Metropolitan's collection is about 7% computerized; and other collections are in the early stages of computerization.

Projects involving artifacts and the living collections of zoos and botanical gardens are in planning or funding stages.

The Keycutter



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EDP Auditors to Gather to Define Role

CW West Coast Bureau

CHICAGO – A conference on EDP auditing, scheduled June 13-14 at the Pheasant Run Lodge, will attempt to deal with the "real, everyday problems" of auditors, according to Howard Friedman, president of the EDP Auditors Association.

Societies/ User Groups

The theme of the association's second annual conference is "EDP Auditing: Define It – Do It!"

Some of the session titles are: "EDP Auditing – Define It from the Auditor's Point of View"; "The Systems Life Cycle and Its Audit"; "What's Wrong with Computer Auditing"; "Computer Frauds and Auditors' Responsibility"; and "Challenge the EDP Experts."

Another session will deal with the association's effort to define control objectives and additional sessions will be on banking, insurance, manufacturing and public accounting.

Inquiries should be sent to the EDP Auditors Association, Inc., P.O. Box 15562, Los Angeles, 90015.

National Academy of Engineers Honors Eight DP Contributions

WASHINGTON, D.C. – Seventy-eight engineers have been elected to the National Academy of Engineering, including:

Isaac L. Auerbach, Auerbach Corp., for his contributions to the development and application of digital computer systems.

Jordan Jay Baruch, Harvard University, for contributions to the application of computer technology.

Lewis McAdory Branscomb, IBM, for leadership in advancing national and international science and technology.

Harold Chestnut, General Electric Co., for his contributions to the theory and practice of control systems and systems engineering.

James Rutherford Fair Jr., Monsanto Co., for his work on the computer simulation of chemical processes.

Jean Howard Felker, Bell Laboratories, for contributions to digital systems including the design of the first transistorized computer.

John Coulter Hancock, Purdue University, for contributions to communication theory and adaptive pattern recognition.

Donald O. Pederson, University of California-Berkeley, for leadership in integrated circuits research and innovation in related computer-aided design.

DPMA Schedules Manager Course

CHICAGO – A series of management development programs, designed by and for data processing managers, has been announced by the Data Processing Management Association.

AIM (Advanced Instruction in Management) will make its debut at the La Salle hotel here, May 29, with a program entitled "Profitability – The Road to Success in Data Processing."

Other AIM sessions developed by DPMA include "Effective Personnel Management in Data Processing," and "Improving Data Processing/User Relationships."

Program fees for DPMA members are $65 and $75 for nonmembers.

Further information on dates and locations for future sessions is available from Betty Wojtal, DPMA, 505 Busse Hwy., Park Ridge, Ill., 60068.

Calendar

April 16-19, Miami Beach – **Univac Users Association.** Contact: B.J. Frable, Sperry Univac Division, Sperry Rand Corp., P.O. Box 500, Blue Bell, Pa.

April 18-20, Nashville, Tenn. – **ACM Southeastern Regional Meeting.** Contact: Charles Brashaw, Director of the Computer Center, Vanderbilt University, Box 1717, Station B, Nashville, 37235.

April 19-20, Wichita, Kan. – **Wichita Industrial Trade Show and Technical Conference.** Contact: W.I.T.S. '74, P.O. Box 203, 67201.

April 21-24, Washington, D.C. – **IBFI 21st Annual Meeting.** Contact: Robert J. Dentz, IBFI/PIA, 1730 North Lynn St., Arlington, Va. 22209.

April 22-23, Atlanta – **Paper Industry Management Association Sixth Annual EDP Conference.** Contact: Pima, 2570 Devon Ave., Des Plaines, Ill. 60018.

April 22-26, Chicago – **Word Processing and Administrative Support Week.** Contact: Office Management Systems Corp., 37 West 72nd St., New York, N.Y.

April 23-25, Bethesda, Md. – **Information Science and the Health Care Institution,** sponsored by the Hospital Information Systems Sharing Group. Contact: Michael D. Dunn, 605 E. Algonquin Road, Suite 450, Arlington Heights, Ill. 60005.

April 25-27, Lawrence, Kan. – **Eighth National/International Sculpture Conference.** Contact: Elden C. Tefft, The National Sculpture Center, University of Kansas, 66045.

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- The use of facilities management.

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- How to set reasonable performance standards for warranties.
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You'll also receive a valuable reference notebook which will back up the information you'll receive at this meeting. *The notebook will include sample vendor contract forms.*

Roy N. Freed, a leader in this field.

Roy Freed has specialized in computer-related legal matters for many years. He has served as inside counsel for a major manufacturer of digital computers, and is currently engaged in **private practice with a prominent Boston law firm.**

He has authored many articles on the various legal aspects of computers – including "Computer Frauds – A Management Trap" *(Business Horizons)* **and a book entitled "Computers and Law – A Reference Work." Mr. Freed will personally conduct the entire seminar.**

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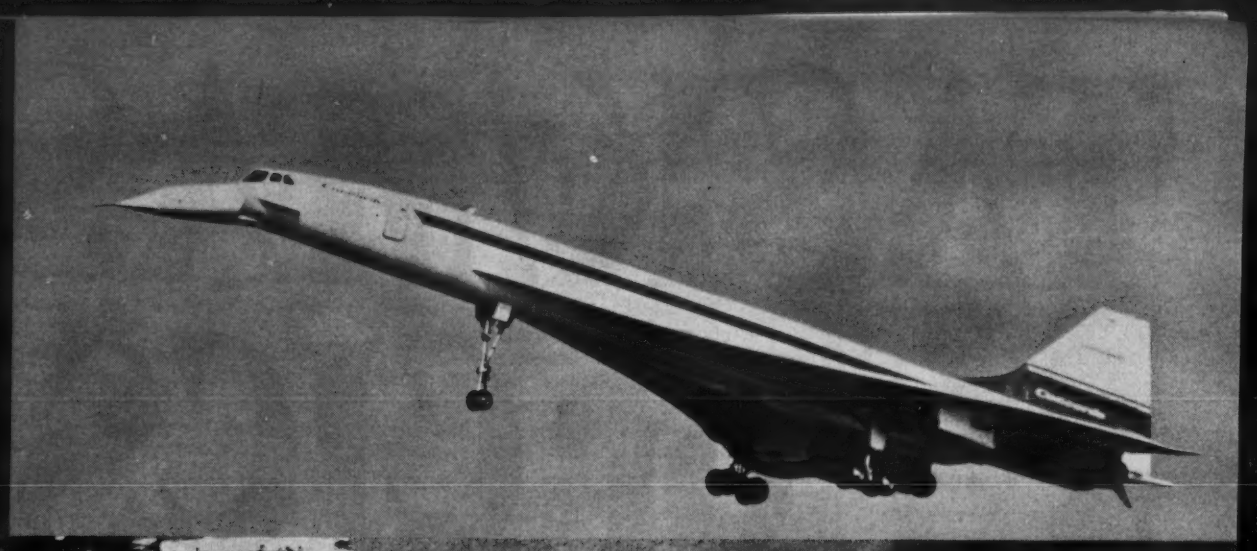

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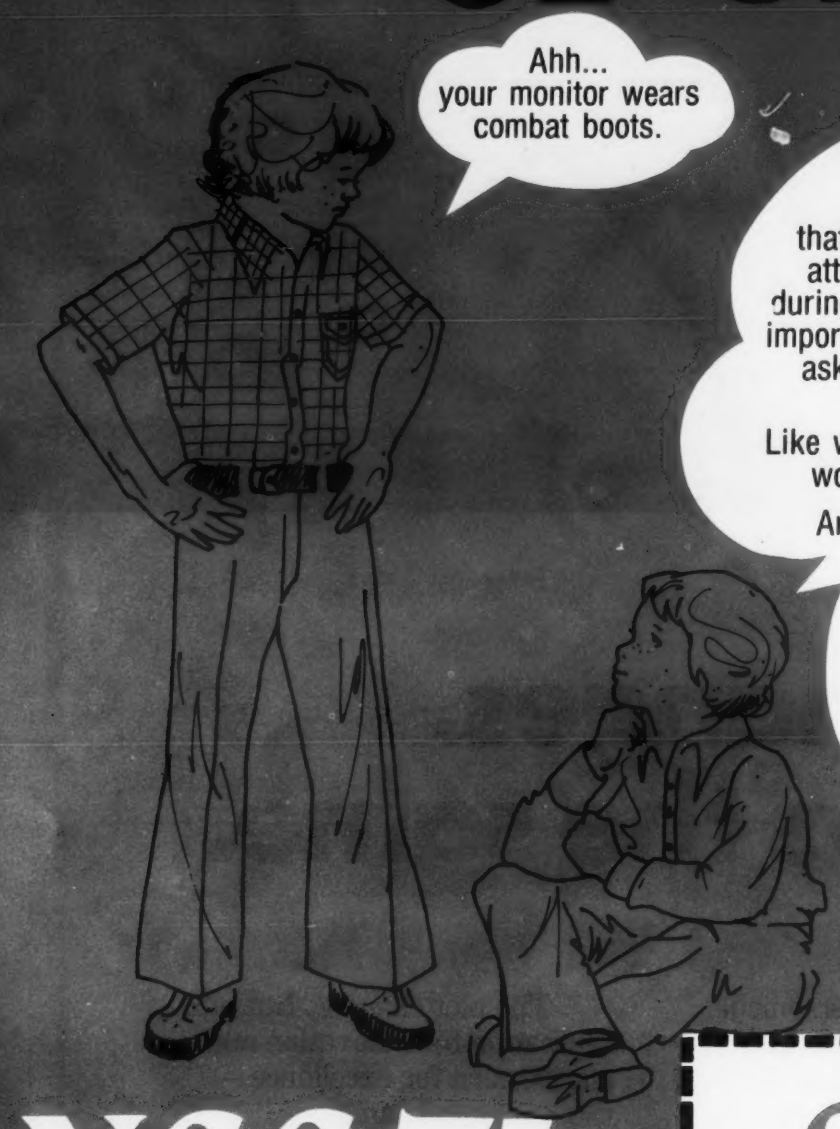
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New Technique Gives X-ray Look at Protein

YORKTOWN HEIGHTS, N.Y. – A computer-based technique to aid in the final stages of determining how atoms are arranged in proteins and other large molecules has been developed by a mathematician at IBM here.

The technique, which relies on mathematics and computer processing, offers X-ray crystallographers the possibility of producing, in hours, results that can take years to obtain by previously known methods, according to the developer, Dr. David Sayre.

The new structure-determining process starts at a point where individual atoms cannot yet be seen on a topographical map showing the density of electrons in the molecule. As computation proceeds, increasingly fine approximations to the molecule's true structure are calculated so that, finally, almost all of the atoms come clearly into view.

In its first application, the technique was used to determine the arrangement of the atoms in rubredoxin, a protein that was isolated from the bacterium clostridium pasteurianum.

Starting with a map showing the structure of rubredoxin at a resolution of 2.5 Angstroms, Sayre's method improved the resolution to 1.5 Angstroms, about the distance that separates the centers of neighboring atoms. At that resolution, he was able to locate and identify some 400 of the protein's 424 non-hydrogen atoms. The computation took about 15 hours on an IBM 360/91.

The new technique belongs to the family of so-called "direct" methods, which have been widely used in crystallography during the past two decades. These methods depend on the existence of mathematical relations among the crystal structure factors, whose values define the distribution of matter within a molecule. They allow the calculation of molecular structures directly from physical principles.

Until now, direct methods have been limited mainly to the analysis of molecules considerably smaller than proteins. One of the more frequently used direct methods employs the "squaring method" system of equations developed by Sayre in 1951. In the case of the smaller structures, these equations often can be used to achieve, without any starting approximation, an electron density map of sufficient fineness to reveal the location of atoms within a crystal lattice.

In the new technique, because the computation is started with a relatively good approximation of the structure, it is possible to deal with a much larger structure and still complete the analysis in a reasonable time.

In Sayre's work on rubredoxin, he used 5,034 structure factors to determine the structure at 1.5 Angstroms resolution. At the outset of his computation, the amplitudes and phases of 1,608 of these factors were known from heavy atom methods and these gave the structure at 2.5 Angstroms resolution. Amplitudes of the remaining factors were also known, and the problem was, thus, to calculate the missing phase angles.

Because Sayre's technique for computing phase angles is an iterative process – increasingly accurate values are obtained during each succeeding cycle of computation.

St. James Place, Yes; Boardwalk, No!

BETHESDA, Md. – How to succeed in "Monopoly": don't invest in Boardwalk or Park Place.

A high school senior here – with the help of a computer – found that dollars are better spent developing St. James Place and Tennessee Avenue.

Considering the costs of building them up and the frequency with which people land on them, these areas are the best on the board, according to the computer analysis of the game.

A student at Bethesda's Walter Johnson High School, Lloyd Treinish did a computer analysis of "Monopoly" as a project for the National Westinghouse Talent Search, an annual science competition for teenagers. Initially, Treinish programmed the computer to learn chances of landing on each of the 40 game squares and the best investment to make with certain amounts of money.

But the amount of data generated convinced him that only a computer could efficiently absorb and utilize the information, so he programmed the computer to play "Monopoly" by itself. Now he's working on a program to teach it to play with him, admitting this will probably limit his chances to win.

The computer's analysis contains several helpful hints for "Monopoly" freaks:

- Railroads are excellent investments, but only at the beginning of the game. Reading Railroad is landed on more frequently than any other such property, while Short Line is landed on the least.
- The gray properties (Oriental, etc.) are also good early in the game. The reds (Kentucky, etc.) and the greens (Pacific, etc.) prove advantageous later on, if you still have money to throw around. Stay away from the yellows (Marvin Gardens, etc.) because the system indicated that people do not land on them enough to provide a good return on your investment.
- If you go in for houses and hotels, build up one property before going on to the next, otherwise you may spread your development thin.
- Seriously assess your abilities before challenging a computer to the game.

Not a Drop to Drink

SALT LAKE CITY, Utah – Drinkers here are finding some shortages of their favorite liquors because of bugs in the Liquor Control Commission's new computer-based inventory control system.

The system is designed to cut down on errors in the system and the overstocking of hard-to-move items, but is having the opposite effect in some cases – resulting in a shortage of fast-moving brands, officials noted.

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To the Technical Data Communications Professional who may be worth a great deal more than he ever dreamed

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Why do we mention these things? To blow our own horn? To impress you? Perhaps. But that's not the real reason. The fact is, the only thing that's stopping us from growing at an even faster rate is you! We need solid, talented, technical people who are looking for a long term career... not just a job. We do have very precise requirements, however. Not everyone is right for us any more than we're right for everyone.

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CI Notes

IBM Secrets Theft Trial Scheduled for September

CW West Coast Bureau

SAN JOSE, Calif. – The trial of persons accused of stealing disk drive trade secrets from IBM has been postponed to Sept. 16 and charges against three of the 11 defendants have been dismissed because of insufficient evidence.

Superior Court Judge Peter Anello agreed to reset the trial date – scheduled for April 1 – after the defense argued the trial could extend into the summer and cause conflicts for juries and attorneys.

Charges were dismissed against Wolfgang Arnold, president of now-defunct Memory Magnetics International, and John Sueta and Thomas Rauscher, draftsmen formerly employed by Memory Magnetics.

The effort to prosecute Arnold, according to the Santa Clara County District Attorney's office, was severely impaired because of a ruling that 3,000 to 4,000 documents could not be used because they were obtained with a search warrant using three-year-old information.

The charges against the two draftsmen were dismissed because of insufficient evidence and because "recent intensive investigations indicated it was probable they did not know the nature or character of the documents they allegedly copied," a spokesman for the district attorney said.

The alleged trade secrets espionage ring was disclosed last June and it was estimated $660 million worth of trade secrets were stolen.

Telex-IBM Records on Microfiche

ENCINO, Calif. – Firms eager to read the complete record on appeal in the Telex-IBM antitrust suit no longer need to pore through piles of paper, as the Computer Industry Association is making available on microfiche the 8,500 pages of documents.

The set of microfiche costs $595 and includes the appeals briefs, trial transcript and the business documents selected by both Telex and IBM for use by the U.S. Court of Appeals.

The CIA is at 16255 Ventura Blvd.

Supershorts

– – –

Shugart Associates has shipped the 1000th customer production unit of its Diskette Storage Drives.

– – –

NCR has opened its 16th data processing center in Europe. The new Amsterdam center is NCR's second in The Netherlands and its 44th outside the U.S.

– – –

Hughes Ground System Group will manufacture Interdata Model 70 minicomputers built to military specifications.

2 Orders of Magnitude

Magnetic Recording Density Seen Rising

NEW YORK – The decade of the Seventies should see an improvement in magnetic recording density of two orders of magnitude and magnetic recording will continue to play an important role throughout the decade, according to Earl C. Joseph, Univac staff scientist, and Albert S. Hoagland of IBM, Boulder, Colo., at a recent meeting.

"It cannot be overemphasized that we are only at the beginning stages of a new computer revolution which will rapidly ripple throughout the world society . . . To expect to do business as we did in the past now appears to be the high-risk route," warned Joseph.

The tables are turning, and indications are that the "primary forces for new technological developments will emerge from the needs and requirements for microcomputer applications" rather than developments in maxicomputers, leading to innovative usage in the small computer world, he said.

With decreasing costs of hardware, future systems will include more memory and logic. Joseph sees increasing use of smart peripherals, subroutines in hardware, incorporation and advances in MSI, LSI and computers on a chip, electronic communications rather than using paper, networks and terminals.

In the memory field for the next 10 years, he said, rapid advances in semiconductor memory will continue causing increased use and penetration of semis throughout the memory hierarchy.

In addition, storage density for most memory technologies can increase at least two orders of magnitude, and maybe three. "Mass storage based on digital and magnetic recording and storage will continue to play a vital and increasingly important role in information processing," Joseph added.

It will be increasingly difficult for a new memory technology to become cost-effective and displace a current memory technology, he said, because memory production volumes have reached such a high level.

"That is, the problem with a new memory technology will be to get started unless it is cost-effective at the early stages of production or uses current technology production facilities," as do charge-coupled devices (CCDs).

Magnetic recording storage for capacities at and above 10^8 bytes will remain cost-effective compared with semis and bubbles for some time, Joseph said.

Many new applications areas expected to be opened up by the communications revolution "require huge amounts of storage capabilities and new computerized storage system architectures for the dissemination, capture, remote storage and display of information, he noted at the recent IEEE Intercon here.

Hoagland said: "There is presently no economical approach to mass storage that can replace digital magnetic recording. For the foreseeable future, then, mass storage will continue to be based on digital magnetic recording, with the potential for increases in storage density of two orders of magnitude during this decade."

The current state-of-the-art magnetic recording density for production disk files is about 2×10^6 bit/in.^{2}.

"Further major increases in density (and therefore reductions in cost per bit) are expected, based on reported laboratory investigations," Hoagland said.

"There are no known techniques that could make equivalent strides in reducing head-positioning time, although increasing the number of heads servicing the tracks helps," he added.

Hardware reliability needs to be improved if the "full potential of magnetic recording storage devices is to be realized," he noted.

"The storage hierarchy of the near future now appears to include disk files of much larger capacity with an access time of about 10 msec and a low-cost on-line flexible-media library. The latter will provide an archive, backup journaling and infrequently used data that can be staged upward when needed, etc.," Hoagland said. He identified the Ampex TBM and Grumman Masstape as examples of flexible media storage devices.

(Continued on Page 38)

Plan Calls for GSA Control Of Civilian Agency Equipment

By E. Drake Lundell Jr.
Of the CW Staff

WASHINGTON, D.C. – The General Services Administration (GSA) is studying a plan that could consolidate all computer equipment in the civilian agencies of the government firmly under its wing.

The plan, outlined at a recent meeting of the Interagency Committee on Automatic Data Processing, involves "a study to determine the feasibility of fully capitalizing the ADP Fund in accordance with increased pressure in this regard from the General Accounting Office."

The ADP Fund was established by the Brooks bill which consolidated overall responsibility for purchasing computer equipment for civilian agencies under the GSA, even though in the past the agency served more as an advisor on procurements than as the actual buyer.

However, one alternative now being studied would involve "transferring the title of all government-owned computers to the GSA which would then establish a current value and lease the equipment back to the agencies," according to the minutes of the interagency committee.

Another alternative would involve "transferring of agency DP appropriations to GSA," or increasing "direct appropriations to GSA," presumably in a like amount as the agency authorizations.

Under the moves being considered, GSA would apparently receive all appropriations for computer equipment to be used in the civilian arm of the government and would work like a leasing company for the government – acquiring equipment and then leasing it to the using agency.

The rationale behind such a move would be the possible dollar savings available from overall GSA management of the federal inventory and the ease with which the agency would be able to contract for a larger amount of equipment than could any individual agency.

Univac Suing Calif.

Teale Contract Under Fire Again

SACRAMENTO, Calif. – Univac has joined Sanders Associates in suing the State of California, asking that the $19.9 million contract the state signed with IBM for the Teale Consolidated Data Center be set aside.

In the suit, filed in Superior Court here, Univac charged that the state only negotiated with the vendors who eventually got the awards, thus excluding Univac from consideration.

In addition, the Univac suit claims its bid for the Teale center could have saved the state over $9 million during the life of the contract when compared with the awarded contracts.

The Sanders suit contained essentially the same charges but went one step further, claiming state officials acted illegally by bowing to an illegal tying arrangement on the part of IBM [CW, April 3].

Univac asked the court to nullify the entire award on the Teale center and to order the state to reopen negotiations with all of the vendors who submitted bids on the project.

Univac stands to lose a substantial amount of business if the Teale consolidation goes through since it held over 50% of the state's DP business before the award to IBM, including five Univac Series 70 systems that would be replaced.

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Report Finds 360 Lease Erosion

370 Lessors to Reap $314 Million in '74

NEWTON, Mass. – The installed value of IBM 370s leased by third-party leasing companies has passed the $1 billion mark and should bring those companies revenues of over $314 million in 1974.

That revenue level would be a 40% increase over the leasing company revenues in 1973, according to *EDP Industry Report,* published by International Data Corp., a computer industry research firm here.

However, while the picture is bright in the 370 leasing business, there is a deep erosion under way in the 360 leasing field, cutting into the revenues of many of the same firms that are seeing increases through the 370 leased base.

During 1974, IDC predicted revenues from the 360 lease base would decline 13% from $431 million in 1973 to a $377 million level.

The base of 360 equipment in the field has a value of $2.74 billion based on its original cost, even though it has been depreciated to less than half this value by the firms over the past few years, the report indicated.

Inventories Up

At the same time, IDC reported the renewal market for 360 CPUs coming off lease is holding up "fairly well," but many of the leasing companies are having trouble releasing 360 peripheral equipment and are thus increasing inventories in this area.

Overall, the leasing industry – including both IBM and non-IBM mainframes – should reach revenues of $870 million this year, the firm reported, representing a 10% increase over the revenues registered in 1973.

However, this growth rate will be a slowdown from the 14% growth curve charted last year, IDC indicated.

But with the success in the area, IDC said, there have been some major changes in the leasing industry.

For example, IDC found the industry much more conservative today than in the past, which has caused an end to much of the short-term leasing that was available with 360 equipment in the early days of the business.

Most of the leasing companies, IDC said, are requiring a minimum of five-year leases, even though this may change to more full payout deals during the coming year.

In addition, IDC said, lessors are depreciating 370 equipment over a lifespan of eight years or so instead of the more unrealistic 10- and 12-year periods set for the 360.

Magnetic Recording Density Said to Have a Bright Future

(Continued from Page 37)

Heads do not seem to be the limiting factor in performance, he said, noting the emergence of thin-film head technology "lends itself to material-process technology akin to the methods pioneered by the semiconductor industry with consequent possibilities for cost reductions.

"The introduction of thin-film heads will greatly extend the usable bandwidths," Hoagland added.

Hoagland sees a further large increase in linear bit density from reduced head-to-surface spacing.

Electromechanics offers considerable room for further advances in track density, he said. "Track seeking and following servo-access techniques that can circumvent the track-density limitations imposed by the buildup of cascaded mechanical tolerances will be applied to increase track density, since an adequate signal-to-noise ratio with much narrower tracks can be demonstrated.

"Continually improving track registration will necessitate servo techniques that depend on interspersing or superimposing data and servo-control information and on more sophisticated servo and data-head structures," Hoagland continued.

Other means that offer potential for improvement include signal processing, "an as yet inadequately explored means to further increase storage density . . . Applying advanced communications techniques to magnetic recording may yield significant gains in bit density relative to pulse resolution.

"Higher areal densities will require much more sophisticated error-detection and correction codes," Hoagland continued.

"Signal-to-noise calculations indicate that much higher storage densities are possible. During the Seventies, we should see a potential advance in areal density of almost two orders of magnitude. Eventually, density should be primarily limited only by intrinsic media and amplifier noise."

Laser Lag

The improvement in magnetic recording technology and the slower-than-expected acceptance of optical devices and resulting reduction in cost of components for beam-addressable memory have combined to prevent the immediate large-scale application of lasers in memory, observed D. Chen of Honeywell's Corporate Research Center.

"A more opportune time for serious development effort of beam-addressable memory could well be in the late 1970s when technical limitation in conventional magnetic technology is expected to be reached," Chen said.

The technology needed for a bit-by-bit erasable beam-addressable bulk storage is available using rotating disk format, but this offers only slight improvement in access time, Chen stated.

A reliable, high-performance laser diode or array diode could help reduce costs, he said.

Alterable holographic memory offers the best "in beam-addressable memory," but components such as the page composer, detector diode array and memory medium require further research and development.

"It is believed that this technology will not be ready much before 1980," Chen concluded.

Presence Abroad Need Vital: HP

NEW YORK – Manufacturing presence abroad "gives added impetus to sales," observed Bill Doolittle, Hewlett-Packard vice-president of international operations.

Firms with manufacturing plants in a foreign country are regarded as being in "the local club" and their products are better accepted, he explained.

Although HP has 24% of its manufacturing population abroad, 76% of its international sales are exported from the U.S. HP plants in the U.S. still supply a fairly large portion of components to its plants abroad, he added.

It is becoming increasingly difficult to build products abroad as cheaply as in the U.S., he noted, but the advantages of presence abroad are considerable.

Overseas order rates grew at a strong rate during 1973. Nine major markets showed anywhere from 35% to 84% improvement over the 1972 figures.

Germany and Japan, the two largest overseas markets for HP, grew 57% and 83% respectively in 1973. France and the UK grew 47% and 49% respectively, Doolittle said.

The first quarter of 1974 started out with Australia's order rate growing at 126%, while Germany and Japan rates were 49% and 71% over those of the year-ago period.

HP has received permission to open an office in the Soviet Union and is establishing a technical liaison in Warsaw.

The first quarter saw a 172% increase in orders in Eastern Europe over the same 1973 period.

Computerworld Sales Offices

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Canada Warned on Shortages

OTTAWA, Ont. – Inflation and shortages of key materials will continue to be the major economic problem throughout much of 1974, according to IBM Canada's president.

L.K. Lodge predicted that Canada's upward trend in 1974 would slow to a rate of perhaps 4%.

Forecasting the need for business to improve productivity in the face of rising costs and decreased markets, the IBM executive predicted a strengthening of the role of computers in business management.

"We expect the current trend in the larger corporations toward centralized data processing, via telecommunications and terminals, will accelerate in 1974," Lodge said.

He added that special-purpose systems, such as for banking and retailing, would become a major part of the Canadian product line.

International News

It's Fair in Hanover

HANOVER, W. Germany – The Hanover Fair April 25-May 3 will feature about 4,700 exhibitors from 30 countries. The products on exhibit range from office furniture to chemical raw materials to DP products, organizers said.

Wang Laboratories is scheduled to show its 2200 as well as tape, disk and printer units in addition to a flatbed plotter.

ICL's German unit will unveil the 1901T and 1902T computers.

IBM Deutschland, GmbH, plans to show the 3211 2,000 line/min printer, the 3886 optical character reader, the 3650 point-of-sale system, along with the 3600 finance communication system.

Other exhibitions will include minicomputers from Rumania.

Canada to Study Nets

KITCHENER, Ont. – The University of Waterloo has been awarded a $709,000 grant by the National Research Council to study basic needs for Canadian computer networks. This study would cover Canadian fears that too much Canadian data is stored in U.S. data banks.

The five-year project will be aimed at gathering information on computer network technology, investigating Canadian problems in the field, developing new services that can be used by Canadian business and investigating some basic research questions.

Nixdorf Makes Strides In South Africa Market

DURBAN, S. Africa – Nixdorf Computer Pty. expects to have gained about 10% of the $30 million market for minicomputers in South Africa as of the end of 1973, according to Chairman Howard Brinkworth.

The mini market should grow at about twice the rate of the market for larger systems and will be worth $37.5 million in five years, he estimated.

Nixdorf is aiming at a 25% to 30% share, he added, and is expanding into four additional cities and tripling its staff to more than 2,000 by the end of 1975.

As of October, the firm had made more than $1.8 million in sales since the beginning of the year when the subsidiary was established.

In July alone, sales totaled $723,030, equal to the total sales of a year ago.

Aussie Freight Suffers

MELBOURNE, Australia – The energy crunch is making it difficult for manufacturers to procure space on airfreight to Australia.

Control Data Australia said the situation is "serious," according to a recent report in *Computer Weekly*. Space on regular flights is difficult and charters have to be planned ahead.

Because of the devaluation of the U.S. dollar, exports have been reduced to the U.S., resulting in higher charter costs for goods being shipped into Australia.

UK Front-Ends 158

LONDON – The Meteorological Office here is using a 370/158 as a front-end processor for its 370/195.

The new system was purchased as an alternative to adding 1M byte of storage to the 370/195, which, according to *Computing*, would have cost about the same.

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If you're an advertiser, you should also note that we'll be distributing extra copies of *Computerworld* right at the show. So you'll get more readership than ever. Issue and closing dates are below. For more information, just contact your *Computerworld* representative. Or call or write Judy Milford at *Computerworld*, 797 Washington Street, Newton, Mass. 02160 (617) 965-5800.

	Issue Date	*Color Close*	*B & W Close*
NCC Preview Issue	**May 1**	**April 12**	**April 19**
NCC Show Issue	**May 8**	**April 19**	**April 26**
NCC Wrap-Up Issue	**May 15**	**April 26**	**May 3**

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Overseas Units Boost Burroughs

DETROIT – While Burroughs Corp.'s earnings and revenues rose last year, the firm managed to improve its financial position by reducing its debt by $121 million and increasing its cash and marketable securities by $69 million.

Overseas operations continued to play an important role in overall earnings, as detailed in the firm's annual report.

Foreign operations accounted for 46% of the firm's earnings of $115.9 million for the year.

Overseas revenues for the year ended Dec. 31 rose 20% while revenue from all group operations in the U.S. grew 23%. Worldwide revenues totaled $1.28 billion, up 22% over the year-ago figure of $1.05 billion.

The Business Machines Group, which markets Burroughs DP systems and small application machines in the U.S., had revenues totaling $583.3 million, up 21% since 1972.

The International Group, the foreign counterpart, had revenues of $454 million, up 19%.

Orders for EDP systems and products, including minicomputers, rose 33% over 1972. Orders for small computer systems alone increased more than 200%.

Small Product Growth

Ray W. Macdonald, chairman, told shareholders at the recent annual meeting the vigorous growth in the smaller product market sector was "one of the most important developments in the continuing evolution of our company."

The firm's small computer systems have wide applications in "the very strong trend toward decentralized networks," he remarked, adding the development of these networks represents "a great marketing opportunity for Burroughs."

Worldwide order backlogs, net of the value of existing leases to be replaced, reached $1.01 billion, up 30% from the $777 million at the end of 1972.

Burroughs reduced its long-term debt, including current maturities and notes payable, by $121 million. "A major contribution to debt reduction was the conversion into common stock in February of $99.3 million of convertible debentures," President Paul S. Mirabito and Macdonald observed in the annual report.

Working capital increased 12% and totaled $459 million at the end of 1973. Burroughs showed an improved yield from rental equipment of about $233 million in revenues during 1973.

Sale of equipment and systems generated an additional $600 million in revenue. In 1972, the total lease/sale revenues from this category was $693.5 million.

"Shipments at sales value of EDP systems and products, including custom systems and business minicomputers, increased 28% in 1973 and reached $1.035 billion," they said.

Broken down into categories of products, large and medium systems generated $481.5 million in revenue, up 25%; small computer systems and business minicomputers, $234.3 million, up 28%; and small application machines, $117.4 million, down 6%.

In other product groupings, field engineering services revenues rose 7% to $234.5 million from $199.7 million last year, while business forms and supplies revenues were up 22% to a record $122 million. Custom products and electronic components revenues reached $73.9 million, up from $46.6 million a year ago.

Capital expenditures in 1974 are expected to total about $255 million, Mirabito said, of which about $200 million will be used to expand the company's rental account. The remaining $55 million will be for plant, tools, equipment and expansion of marketing facilities, an increase of nearly 60% over 1973.

During 1973, capital expenditures totaled $181 million, a 23% increase over the 1972 figure. Of this amount, $146.4 million was allocated for rental equipment, compared with nearly $115.1 million in 1972.

R&D expenditures for 1974 will be around $80 million, compared with $66 million in 1973, which represented a 23% rise from $53 million in 1972. "The expansion of these activities includes increased expenditures for program products of approximately $5 million in 1973 and $3 million in 1972," the report said.

Worldwide equipment production volume, which was increased 34% in 1973, is planned to be increased by an additional 36% this year," Mirabito said.

Shareholders at the annual meeting approved a two-for-one stock split, voting to increase the number of authorized common shares to 60 million.

Expansions

Megadata Computer and Communications Corp. has relocated its offices and manufacturing facility to 35 Orville Drive, Airport International Plaza, Bohemia, N.Y.

Microdata Corp. has expanded its manufacturing capability with the addition of a 12,000-sq-ft printed circuit board production facility in Santa Ana, Calif.

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THE FORUMS user-to-user in '74

The Computer Users' Forums give you a unique opportunity to exchange information with other users and independent experts about current practical problems. Forums run from 9:00 A.M. to 2:30 P.M. each day, including an opening report, panel discussions, morning and afternoon workshops and luncheon. If you register in advance for the User-to-User Forums, *you'll save $5 per day* from the price at the door. If you attend all three days, *you'll save $15,* just for acting early. (Note that no advance registration is required if you attend the Exposition only).

Here are the Forum topics for '74

First Day — **Source Data Automation Today**
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Optical Scanning and Off-Line Key Entry

Second Day — **Data Communications Update**
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On-Line Systems and Equipment Selection

Third Day — **Operations Management**
with workshops on
Performance Measurement, Project Control,
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Each day an important, current topic is discussed in an open afternoon session at 2:45 P.M. — free to all Caravan attendees. In 1974 we'll be looking at:

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☐ Third Day — Operations Management

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☐ Charlotte	Apr. 23-25	Charlotte Civic Center*
☐ New York	Apr. 30-May 2	Americana of New York

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***Note: Earlier ads had incorrect location for Charlotte. Correct location for both Forums and Exposition is: Charlotte Civic Center, 101 South College Street**

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Japanese Firm Plans Buildings From Drafting to Construction

By Shukan Computer
Special to Computerworld

TOKYO – Structural Planning Laboratory (SPL) here has been concentrating on the development of software for the computerization of civil engineering.

SPL was a pioneer in the use of computers in the civil engineering field. Initial applications consisted mainly of automatic drafting, but recently the shift is towards structural analysis, management of engineering works, management of work progress and planning itself.

Planning encompasses many things. For example, when building a passenger station, the volume and flow of passengers must be simulated in order to design such things as the width of the staircase and the placement of entrances and exits, thus including human psychology and habits in the actual construction plan.

To develop these programs, SPL uses a Facom 230-45S. SPL developed its own subroutines to link up an IBM 2250 graphic display unit, but discontinued its use after two and a half years because it took too long to develop the software.

SPL found the subroutine package normally supplied to be insufficient, and as structures became complex the CRT surface glittered, preventing checks and making its use on a full scale difficult.

However, it was effective to a degree for running structural analysis programs and as a debugging unit for automatic drafting, and shortened the development period of the automatic drafting program.

Currently, Iwata's drum-type plotter and Gerber's bed-type plotter are being used for such things as the graphic output of analytic results.

SPL participated in the automation of the planning of a series of projects including Japan National Railroad's (JNR) elevated and prestressed concrete railroad bridge construction.

Along with the development of a program of automatic planning, it also developed a debugging system for JNR's technical research division.

In addition to the JNR project, SPL is developing programs for the Housing Corp., the Telegraph and Telephone Corp. and electric power companies.

Programs for the Housing Corp. are for the preparation of residential sites, i.e., area calculation, plans for raising the ground level and drafting contour lines for foundations.

For electric power companies, in addition to dams, SPL deals with the problems of warm water drainage into the sea caused by atomic-powered electric generators. The program simulates water temperature distribution and diffusion, and the results are drawn by the plotter.

At the Telegraph and Telephone Corp., SPL's program for engineering management is being used at the Osaka Data Communication office building which is under construction. Over a three-year period, this program will be managing plans for bringing in building materials and disposition of construction workers.

SPL is also developing simulations related to daylight hours, noise and station design, with the emphasis shifting towards programs which come under the heading of planning.

In-House DP Boosts Book Business

Special to Computerworld

LISSE, The Netherlands – Switching from a service bureau to an in-house computer has helped a Dutch firm involved in international sales of books and subscriptions to treble turnover in the last three years.

It has also helped the firm move from costly premises in the center of Amsterdam to this small town where it occupies a single new building compared with two separate buildings before.

Swets and Zeitlinger first began using a service bureau in 1958 during a cost squeeze caused by lower discounts from publishers and rising staff costs. But new problems kept cropping up and in 1969 the firm started seriously thinking about its own computer. A market investigation seemed to justify the expense.

The company uses a Univac 9400 and a CRT to access the 35,000 journal titles and about 500 publishers whose names are stored on file.

About 5% of orders are for titles not yet on the files.

"The additional business we have gotten from the subscription service alone is paying for the computer installation," said W.J. Tieleman, a director.

Now the company is looking for new ways to utilize its system.

One idea is to put on file the millions of book and journal titles in stock. This, it is estimated, will probably take two to three years. Then there are plans to offer a completely new service – supplying catalog data for a library.

Foreign Orders & Installations

Promon Consulting Engineers, Sao Paulo, Brazil, has ordered a Hewlett-Packard 3000 for scientific calculations and management applications.

The Tokyo Marine and Fire Insurance Co. has ordered a Univac 1110 to process automobile insurance in a real-time operation.

Compagnie Generale des Eaus, Paris, has installed Task/Master, a telecommunications monitor created by Turnkey Systems, Inc.

The Helicopter Division of Societe Nationale Industrielle Aerospatiale, the French national aerospace agency, has ordered a Systems 85 from Systems Engineering Laboratories to replace an IBM 1800, IBM System/7 and an IBM 2780 terminal. In addition to dedicated applications, the 85 will serve as a remote job entry terminal for an IBM 370.

Kybe Corp. has installed its TMS-200 Model VII tape maintenance system at the Banque Nationale de Paris.

The Spanish National Telephone Co. has ordered a Univac 1110 to serve as the heart of the Spanish national network for data transmission.

Radio-Suisse Ltd., which handles air navigation services in Switzerland, has ordered an Alfaskop 3500 programmable terminal system from Stansaab Elektronik AB of Sweden. The system will be used to coordinate flight plan data between centers in Zurich, Geneva and a military control center.

The Darlington Building Society, a British savings and loan institution, has ordered an NCR Century 101 to handle investment and mortgage accounting.

A Digital Equipment Corp. PDP-8E has been installed at the Ravenhead Works of the Pressed Glass Division of Pilkington Bros. Ltd., Lancashire, England, where it monitors production of glassware for television tubes.

Nissan Motors Co., Tokyo, has installed a Univac 1106 system. A graphic display terminal will be connected to the 1106 for drawing, checking and modification of automobile body designs.

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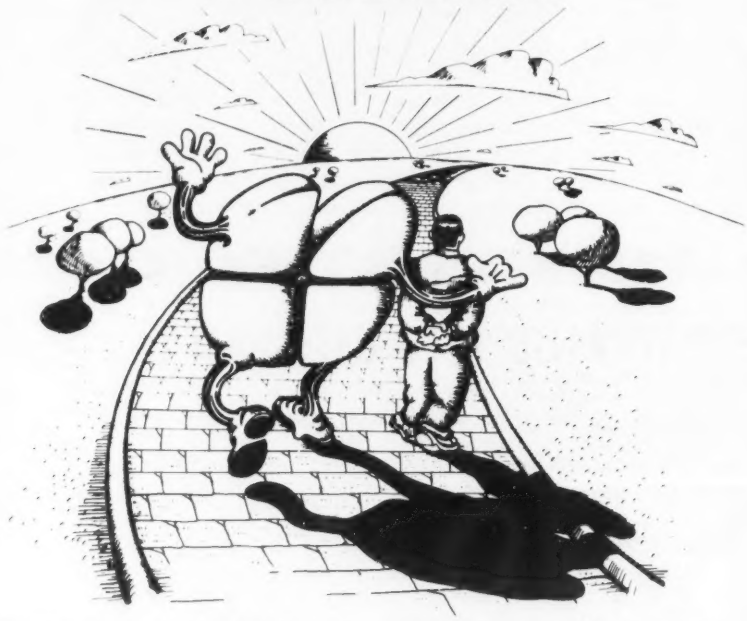

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02 Data Processing & Operational Management
03 Data Processing Professional Staff
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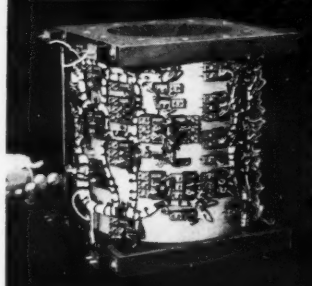

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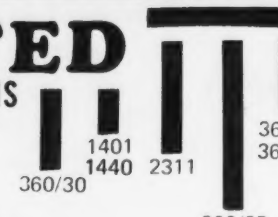

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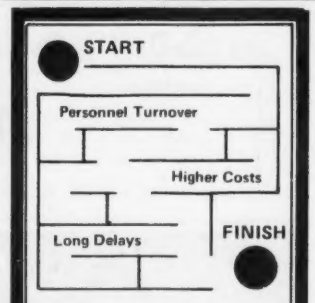

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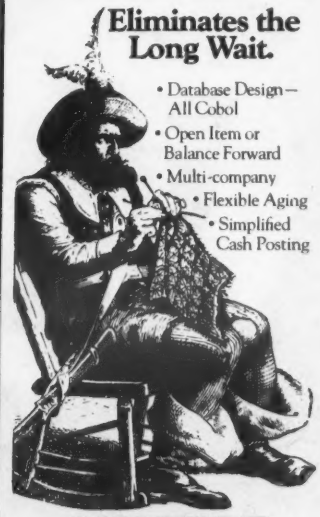

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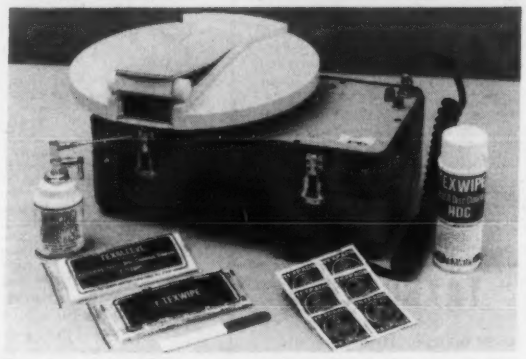

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Modcomp, Microdata Find Minicomputers Profitable

Two minimakers, Modular Computer Systems (Modcomp) and Microdata Corp., reported improved results for various periods recently.

It was a record year for Modcomp, with operating income growing by more than six times to $782,000 or 39 cents a share from $100,000 or 6 cents a share a year ago.

Revenues more than doubled to $12.4 million from nearly $5 million last year.

With a tax credit from a loss carryforward, earnings for the year ended Dec. 28 totaled $1.4 million.

For the fourth quarter, operating income reached $279,000 or 12 cents a share compared with $131,000 or 7 cents a share a year ago.

Revenues jumped to $4.1 million from $1.8 million.

Microdata scored record revenues of $3.2 million for the three months ended Feb. 28 compared with $2.3 million a year ago.

Earnings totaled $309,900 or 20 cents a share compared with $283,985 or 17 cents a share a year ago. Figures include $148,800 and $136,000 tax credits, respectively.

"The company's new products contributed significantly to both shipments and backlog during the second quarter," observed President Donald W. Fuller.

The company's gross margins are expected to improve in future quarters by realizing the economies of scale and from the in-house manufacturing of printed circuit boards and core memory planes, he added.

Data General Earnings Climb

SOUTHBORO, Mass. – Data General Corp.'s earnings and revenues climbed during its second quarter and six months.

In the 12-week period ended March 16, earnings rose to nearly $1.9 million or 23 cents a share compared with $1.4 million or 17 cents a share for the year-ago period.

Revenues reached $14.9 million compared with $11.2 million last year.

In the 24-week period, earnings reached $3.7 million or 46 cents a share compared with $2.6 million or 32 cents a share a year ago.

Revenues climbed to $29.8 million from nearly $21 million a year ago.

Pertec Income Declines 'as Anticipated'

EL SEGUNDO, Calif. – Pertec Corp.'s earnings from operations declined "as anticipated" in the second quarter and six months on increased revenues, although with a tax credit in 1973 and a special charge in 1972, the firm showed improved net earnings.

However, the company expects to show a profit in the second half of the year despite reduced sales volume on its CRT and shared processor and write-offs of printer development, President Ryal R. Poppa said.

Operating income was "adversely affected by production delays of our line printer and the continued engineering support and other costs necessary to bring our production capacities into line with anticipated shipments of the shared processor and CRT terminal," observed Poppa.

Delays in orders and deliveries for the shared processor and CRT terminal caused the company to postpone its profit expectations until the second half.

Pertec discontinued the manufacturing program for its P7330 line printer, Poppa said.

"Any write-offs associated with the printer will be reflected in fiscal 1974," he added.

Operating earnings for the second quarter dropped to $147,000 or 5 cents a share from $273,000 or 9 cents a share in the year-ago period.

After a $56,000 tax credit this year and an $80,000 charge for a proxy contest last year, net earnings in the recent quarter totaled $203,000 or 7 cents a share compared with $193,000 or 6 cents a share in the year-ago period.

Revenues rose to $7.3 million from nearly $6 million in last year's quarter.

The story was similar for the six-month period; revenues rose to $15.2 million from $11.9 million, while operating earnings dropped to $399,000 or 13 cents a share compared with $727,000 or 24 cents a share in the same period last year.

After a $262,000 tax credit this year and the $80,000 charge in fiscal 1973, earnings totaled $661,000 or 22 cents a share compared with $647,000 or 21 cents a share in the year-ago period.

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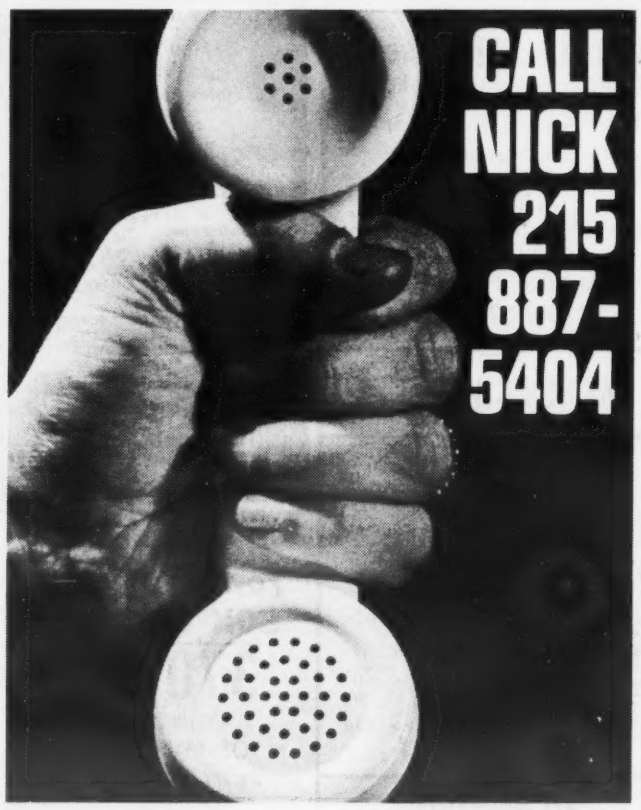

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Earnings Reports

WYLY
Year Ended Dec. 31

	1973 (000)	1972 (000)
aRevenue	$105,760	$101,031
Disc Op	.....	(17,413)
bSpec Chg	1,219	51,032
Loss	4,776	82,781

a-Excludes unconsolidated income from insurance premiums written. b-In 1973, from sale of an operation; in 1972, primarily from write-off of goodwill, loss from sale of a subsidiary and depreciation charge against computer equipment.

MOHAWK DATA SCIENCES
Nine Months Ended Jan. 31

	1974	a1973
Shr Ernd	.....	$.01
Revenue	$126,261,000	104,415,000
Tax Cred	b173,000	.....
Earnings	(6,245,000)	5,780,000

a-Includes operations of Elastolabs Corp. and Computing Efficiency, Inc., which were acquired Jan. 12, 1973 and March 5, 1973, respectively. b-From foreign tax-loss carryforwards.

MACRODATA
Year Ended Dec. 31

	1973	1972
Shr Ernd	$.82	$.92
Revenue	8,609,000	4,699,000
Tax Cred	.....	210,500
Earnings	655,000	599,286
3 Mo Shr	.21	.15
Revenue	2,837,000	1,163,000
Tax Cred	.....	35,000
Earnings	171,000	110,000

TELEX
Three Months Ended Dec. 31

	1973	1972
Shr Ernd	.....	$.08
Revenue	$24,919,000	26,542,000
Earnings	(4,531,000)	862,000
9 Mo Shr	.....	.22
Revenue	67,237,000	67,486,000
Earnings	(14,688,000)	2,277,000

WILTEK
Three Months Ended Jan. 31

	1974	1973
Shr Ernd	$.10	$.03
Revenue	3,743,000	1,984,000
Spec Chg	.....	a2,000
Earnings	142,000	38,000

a-Consists of expenses associated with the relocation of operations to new facilities less a gain from sale of land.

KEYDATA
Three Months Ended Jan. 31

	1974	1973
Shr Ernd	$.05	$.07
Revenue	2,904,000	2,294,000
Tax Cred	60,000	95,000
Earnings	124,000	201,000
6 Mo Shr	.16	.13
Revenue	5,776,000	4,443,000
Tax Cred	200,000	178,000
Earnings	427,000	377,000

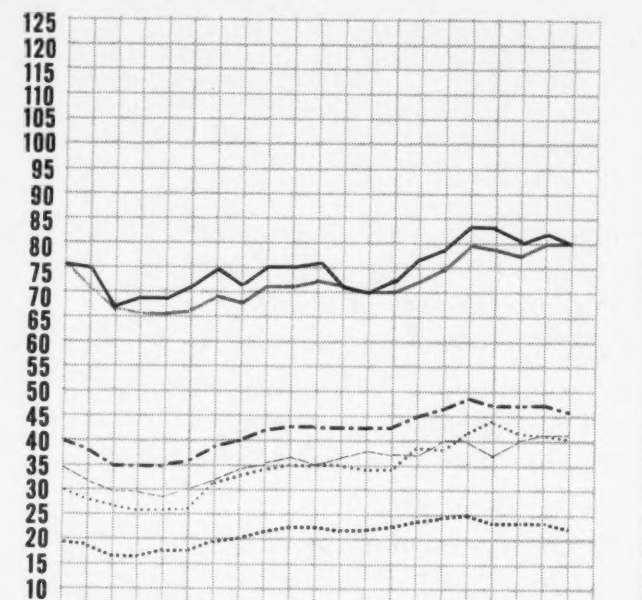
NASHUA
Year Ended Dec. 31

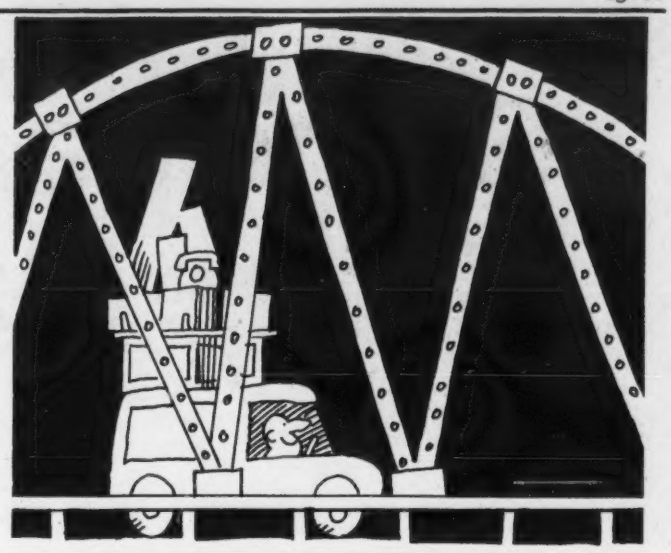
	1973	1972
Shr Ernd	$2.55	$2.15
Revenue	223,268,000	170,612,000
Earnings	11,550,000	9,714,000
3 Mo Shr	.69	.64
Revenue	61,225,000	45,273,000
Earnings	3,111,000	2,907,000

GREYHOUND COMPUTER
Year Ended Dec. 31

	1973	1972
Shr Ernd	$.64	$.95
Revenue	45,642,000	46,918,000
Earnings	2,768,000	4,107,000
3 Mo Shr	.19	.21
Revenue	12,234,000	11,327,000
Earnings	822,000	901,000

COMPUTERWORLD Computer Stocks Trading Indexes





Our New York Office has just crossed a bridge.

Don Fagan and Frank Gallo, *Computerworld's* intrepid Eastern Regional salesmen, have pitched a new office. They can now be found overlooking the toll booths of the George Washington Bridge in Fort Lee, New Jersey—just 20 minutes from downtown Manhattan. Their new address is below and they'd be glad to hear from you any time.

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TRADE*QUOTES

Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		1973-74 RANGE (1)	CLOSE APR 10 1974	WEEK NET CHNGE	WEEK PCT CHNGE
N	BURROUGHS CORP	175-252	196 5/8	-11 5/8	-5.5
N	COLLINS RADIO	16- 26	24 3/4	0	0.0
O	COMPUTER AUTOMATION	5- 20	11	- 3/4	-6.3
N	CONTROL DATA CORP	31- 62	32 1/8	-1 3/8	-4.1
N	DATA GENERAL CORP	28- 49	34 1/4	+ 3/4	+2.2
O	DATAPOINT CORP	10- 21	13 1/4	- 3/4	-5.3
O	DIGITAL COMP CONTROL	2- 6	4 1/8	- 1/8	-2.9
N	DIGITAL EQUIPMENT	73-121	105 1/2	- 3/4	-0.7
N	ELECTRONIC ASSOC.	2- 9	2 3/4	0	0.0
A	ELECTRONIC ENGINEER.	6- 14	8 7/8	+ 1/8	+1.4
N	FOXBORO	23- 48	34 3/4	-3	-7.9
O	GENERAL AUTOMATION	22- 55	33 1/4	-2	-5.6
O	GRI COMPUTER CORP	1- 3	1 3/8	0	0.0
N	HEWLETT-PACKARD CO	70- 99	83 5/8	-2 1/8	-2.4
N	HONEYWELL INC	68-139	74	-3 5/8	-4.6
N	IBM	227-340	230 1/4	-9 7/8	-4.1
O	INTERDATA INC	7- 22	21 1/2	+1 1/4	+6.1
O	MICRODATA CORP	2- 10	3 3/4	+ 1/8	+3.4
N	NCR	27- 46	36 1/2	-3	-7.5
N	RAYTHEON CO	22- 39	34 1/4	+ 7/8	+2.6
N	SINGER CO	34- 74	34 1/4	+ 1/4	+0.7
N	SPERRY RAND	36- 56	39	- 3/4	-1.8
A	SYSTEMS ENG. LABS	1- 8	2	- 1/8	-5.8
N	TEXAS INSTRUMENTS	83-138	96 5/8	-1 3/8	-1.4
O	ULTIMACC SYSTEMS INC	1- 11	1 1/4	0	0.0
N	VARIAN ASSOCIATES	10- 20	10	+ 1/8	+1.2
N	WANG LABS.	13- 34	15 1/4	-1 3/8	-8.2
N	XEROX CORP	106-169	112 1/4	-4 1/2	-3.8

LEASING COMPANIES

EXCH		1973-74 RANGE (1)	CLOSE APR 10 1974	WEEK NET CHNGE	WEEK PCT CHNGE
A	BOOTHE COMPUTER	1- 5	1 1/8	0	0.0
O	BRESNAHAN COMP.	1- 2	2 1/8	0	0.0
O	COMDISCO INC	4- 17	4 3/4	0	0.0
O	COMMERCE GROUP CORP	3- 6	5 1/2	+ 1/4	+4.7
O	COMPUTER EXCHANGE	1- 1	1/4	0	0.0
A	COMPUTER INVSTRS GRP	2- 8	2 1/8	- 3/8	-15.0
O	COMP. INSTALLATIONS	1- 2	3/4	0	0.0
M	DATRONIC RENTAL	1- 3	1 3/4	0	0.0
A	DCL INC	0- 3	5/8	+	+11.0
N	DPF INC	3- 9	3 1/2	- 1/8	-3.4
O	EDP RESOURCES	1- 3	3 1/4	0	0.0
A	GRANITE MGT	2- 6	2 1/8	0	0.0
A	GREYHOUND COMPUTER	3- 6	3 7/8	- 1/8	-3.1
A	ITEL	4- 12	4 3/4	- 1/4	-5.0
N	LEASCO CORP	8- 18	10 3/8	- 1/4	-2.3
O	LEASPAC CORP	1- 8	1 3/8	0	0.0
O	LECTRO MGT INC	1- 2	3/4	0	0.0
O	NRG INC	3- 15	3 1/2	0	0.0
A	PIONEER TEX CORP	4- 8	3 3/4	0	0.0
A	ROCKWOOD COMPUTER	1- 3	3/4	0	0.0
N	U.S. LEASING	16- 36	17 1/4	- 3/4	-4.1

SOFTWARE & EDP SERVICES

EXCH		1973-74 RANGE (1)	CLOSE APR 10 1974	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 2	1 1/8	0	0.0
A	APPLIED DATA RES.	2- 4	2 1/8	+ 1/8	+6.2
O	APPLIED LOGIC	1- 3	3/8	0	0.0
N	AUTOMATIC DATA PROC	39- 94	45	- 1/8	-0.2
O	BRANDON APPLIED SYST	1- 1	3/8	0	0.0
O	CENTRAL DATA SYSTEMS	3- 9	3 1/2	0	0.0
O	COMPUTER DIMENSIONS	1- 5	2	0	0.0
O	COMPUTER HORIZONS	1- 6	3 1/2	0	0.0
O	COMPUTER NETWORK	1- 5	1 3/8	0	0.0
N	COMPUTER SCIENCES	2- 6	3 1/4	0	0.0
O	COMPUTER TASK GROUP	1- 2	1/2	0	0.0
O	COMPUTER TECHNOLOGY	1- 3	1/2	0	0.0
O	COMPUTER USAGE	3- 9	3 1/2	0	0.0
O	COMRESS	1- 2	1/2	0	0.0
O	COMSHARE	2- 9	2 3/4	0	0.0
N	CORDURA CORP	3- 15	2 1/2	- 1/8	-4.7
O	DATATAB	1- 4	1 3/8	+ 1/8	+10.0
A	ELECT COMP PROG	1- 2	1/4	0	0.0
N	ELECTRONIC DATA SYS.	12- 56	13 1/4	-2 1/2	-15.8
O	INFONATIONAL INC	1- 2	3/8	- 1/8	-25.0
O	INFORMATICS	2- 7	6 3/4	0	0.0
O	I.O.A. DATA CORP	1- 1	3/8	0	0.0
O	IPS COMPUTER MARKET.	1- 5	1 1/8	- 1/8	-10.0
O	KEANE ASSOCIATES	2- 5	3 3/4	0	0.0
O	KEYDATA CORP	4- 12	4 1/2	- 1/4	-5.2
O	LOGICON	2- 7	4	- 3/8	-8.5
A	MANAGEMENT DATA	1- 5	1 5/8	0	0.0
O	NATIONAL CSS INC	18- 42	27 1/2	0	0.0
O	NATIONAL COMPUTER CO	1- 1	1/2	+ 1/8	+33.3
O	NATIONAL INFO SRVCS	1- 2	1/8	0	0.0
P	ON LINE SYSTEMS INC	12- 29	25 5/8	- 3/4	-2.8
N	PLANNING RESEARCH	2- 7	2 5/8	0	0.0
O	PROGRAMMING METHODS	17- 25	17	0	0.0
O	PROGRAMMING & SYS	1- 1	1	0	0.0
O	RAPIDATA INC	2- 24	3 1/4	- 1/8	-3.7
O	SCIENTIFIC COMPUTERS	1- 3	7/8	- 1/8	-12.5
O	SIMPLICITY COMPUTER	1- 4	1	0	0.0
O	TCC INC	1- 1	3/8	+ 1/8	+50.0
O	TYMSHARE INC	6- 13	9 5/8	+ 1/8	+1.3
O	UNITED DATA CENTER	3- 6	3 3/4	0	0.0
A	UPS SYSTEMS	2- 8	3 1/4	+ 1/4	+8.3
N	WYLY CORP	3- 11	3 5/8	- 1/8	-3.3

PERIPHERALS & SUBSYSTEMS

EXCH		1973-74 RANGE (1)	CLOSE APR 10 1974	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	9- 34	8 3/4	- 5/8	-6.6
O	ADVANCED MEMORY SYS	4- 23	4 1/2	- 1/4	-5.2
N	AMPEX CORP	3- 7	3 3/4	- 1/8	-3.2
O	ANDERSON JACOBSON	2- 6	2 3/4	- 1/4	-8.3
O	BEEHIVE MEDICAL ELEC	4- 10	4 3/4	0	0.0
A	BOLT,BERANEK & NEW	6- 12	7	- 1/2	-6.6
N	BUNKER-RAMO	6- 18	6 3/4	- 1/4	-3.5
A	CALCOMP	5- 16	9 5/8	+ 1/8	+1.3
O	CAMBRIDGE MEMORIES	8- 17	10 7/8	- 1/2	-4.3
O	CENTRONICS DATA COMP	13- 38	20 1/4	0	0.0
O	CODEX CORP	8- 19	11 1/4	- 3/4	-6.2
O	COGNITRONICS	1- 3	3/4	- 1/8	-14.2
O	COMPUTER COMMUN.	1- 4	1	0	0.0
A	COMPUTER EQUIPMENT	1- 3	1 1/2	- 1/8	-7.6
O	COMPUTER MACHINERY	4- 13	4 3/8	- 1/2	-10.2
O	COMPUTER TRANSCEIVER	1- 6	1 1/8	0	0.0
N	CONRAC CORP	13- 32	18 1/2	- 3/8	-1.9
O	DATA ACCESS SYSTEMS	1- 3	2	0	0.0
O	DATA 100	9- 19	10	- 1/4	-2.4
A	DATA PRODUCTS CORP	2- 5	3 3/4	0	0.0
O	DATA RECOGNITION	1- 3	1/2	0	0.0
O	DATA TECHNOLOGY	1- 5	3 1/4	0	0.0
O	DECISION DATA COMPUT	6- 40	8 5/8	-2 7/8	-25.0
O	DELTA DATA SYSTEMS	1- 1	7/8	0	0.0
O	DIVAN CONTROLS	1- 4	1 3/4	0	0.0
N	ELECTRONIC M & M	3- 6	3 3/8	+ 1/8	+3.8
O	FABRI-TEK	2- 5	2 5/8	0	0.0
O	GENERAL COMPUTER SYS	3- 9	3	0	0.0
N	GENERAL ELECTRIC	51- 76	53 3/4	-2 1/4	-4.0
N	HAZELTINE CORP	4- 9	5 1/4	- 1/8	-2.3
O	INFOREX INC	2- 23	2 1/2	- 3/8	-13.0
O	INFORMATION DISPLAYS	1- 2	1/2	0	0.0
O	INFORMATION INTL INC	8- 15	10 1/4	+ 1/2	+5.1
A	LUNDY ELECTRONICS	3- 9	2 7/8	0	0.0
O	MANAGEMENT ASSIST	1- 1	1/4	0	0.0
N	MEMOREX	2- 19	3 3/4	0	0.0
A	MILGO ELECTRONICS	14- 28	14 3/4	- 3/4	-4.8
N	MOHAWK DATA SCI	2- 13	3 1/4	- 1/4	-7.1
O	ODEC COMPUTER SYST.	2- 6	2	0	0.0
O	OPTICAL SCANNING	2- 8	3 5/8	+ 1/8	+3.5
O	PERTEC CORP	3- 8	3 5/8	0	0.0
O	PHOTON	3- 7	3 3/4	0	0.0
A	POTTER INSTRUMENT	2- 9	3 1/4	- 1/2	-13.3
O	PRECISION INST.	2- 6	1 3/4	0	0.0
O	QUANTOR CORP	4- 10	6 1/4	+ 1/4	+4.1
O	RECOGNITION EQUIP	2- 8	3	0	0.0
N	SANDERS ASSOCIATES	5- 18	5 3/8	- 1/2	-8.5
O	SCAN DATA	1- 6	2	0	0.0
O	STORAGE TECHNOLOGY	11- 34	12 5/8	-1	-7.3
O	SYCOR INC	9- 20	8 1/2	- 1/2	-5.5
O	TALLY CORP.	2- 14	3 7/8	- 1/8	-3.1
O	TEC INC	5- 9	5 3/4	- 1/2	-8.0
N	TEKTRONIX INC	30- 55	41	- 1/2	-1.2
N	TELEX	3- 8	2 3/4	- 1/8	-4.3
O	WANGCO INC	7- 13	11 1/2	- 1/4	-2.1
O	WILTEK INC	6- 18	6	- 1/2	-7.6

SUPPLIES & ACCESSORIES

EXCH		1973-74 RANGE (1)	CLOSE APR 10 1974	WEEK NET CHNGE	WEEK PCT CHNGE
O	BALTIMORE BUS FORMS	4- 9	5 1/2	+ 1/4	+4.7
A	BARRY WRIGHT	5- 13	6 7/8	- 1/4	-3.5
O	CYBERNATICS INC	1- 3	1 1/4	- 1/8	-9.0
A	DATA DOCUMENTS	17- 37	36	0	0.0
O	DUPLEX PRODUCTS INC	6- 10	9 3/8	- 1/8	-1.3
N	ENNIS BUS. FORMS	5- 8	6 3/4	+ 1/2	+8.0
O	GRAHAM MAGNETICS	7- 20	9	0	0.0
O	GRAPHIC CONTROLS	7- 12	10	- 3/4	-6.9
N	3M COMPANY	69- 91	73 7/8	-1 1/2	-1.9
O	MOORE CORP LTD	49- 65	49	0	0.0
N	NASHUA CORP	35- 58	35 3/8	- 1/8	-0.3
O	REYNOLDS & REYNOLD	25- 51	28 1/2	+1	+3.6
O	STANDARD REGISTER	11- 20	14	0	0.0
O	TAB PRODUCTS CO	7- 23	10	0	0.0
N	UARCO	15- 23	19 3/4	+ 5/8	+3.2
A	WABASH MAGNETICS	5- 8	5 7/8	- 1/8	-2.0
N	WALLACE BUS FORMS	14- 26	18 5/8	0	0.0

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
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